



OPERATION AND MAINTENANCE MANUAL

NXL SERIES

HYDRAULIC SLIDING GATE OPERATORS

Model: _____
Serial #: _____

Revised 11/03

For service or maintenance, contact:

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GENERAL DESCRIPTION

The B&B ARMR Corporation. NXL Series Sliding Gate Operators are designed to reliably operate any style of sliding gate, including large or heavy gates. Common applications include automatic operation of commercial and residential entry gates, condominium and subdivision access control gates, airport security gates, and prison access control gates. The operator is unobtrusive in appearance yet durable under heavy use in both commercial and residential installations. The design incorporates many excellent features intended to improve safety and security, increase reliability, and reduce maintenance.

Controls operate on safe and reliable 24VAC voltage (24VDC on Battery Backup units). A transformer, completely prewired, is installed in each operator to step down the input voltage.

The operator actuates the gate by rotating two wheels (the NXLR operator uses a pinion gear). A drive rail bolted to the gate is drawn between the two wheels by friction. The wheels are spring-loaded against the drive rail to produce a positive friction feed in both directions. Spring loading of the wheels also serves to correct for wheel wear. The wheels are rotated by series-connected hydraulic motors to minimize uneven rotation between the wheels.

Rotation direction is determined by the hydraulic valve system, not by the direction of electric motor rotation. Independence from the electric motor rotation has the advantage that the direction of gate travel can be instantly reversed without the use of brakes.

FEATURES

- Simple toggle switch right-hand to left-hand conversion (no wiring changes, limit switch swapping, hose swapping, etc.)
- Safe 24VAC controls standard (24VDC on Fail Safe and Battery Backup units)
- Low maintenance - no sprockets, chains, brakes, or pulleys to adjust
- Direct-position feedback for motion control
- May be used with any type of sliding gate (cantilever, overhead track mounted, or ground track)
- Wear-compensating, spring loaded, friction-feed drive.
- Prewired relay board, with multiple built-in features and "plug-in" options, eliminates complex and confusing internal circuit wiring
- Wide range of control options including, but not limited to, combinations of:

Remote push-button station(s)	Loop detector
Single button control	Free exit
Obstruction detector	Emergency open
Time delay close	Radio control
Master-slave control	Warning light / buzzer

- Complete, easy reference wiring diagrams for all standard control options
- Add-on prewired relay boards simplify the addition of more complicated control options
- Built-in adjustable maximum run timer
- Proximity limit switches, eliminates "false" tripping due to misaligned drive rail
- Instant reverse capability during close cycle for safety and obstruction detection
- Laminated wiring diagram in the electrical box
- Standard units available in 115/208/230 single phase, and 208/230/440 three phase
- Built-in low-voltage compensation capability
- Rigid, lightweight aluminum drive rail for easy gate mounting
- Increased security over chain drive units (no chains to cut or pins to remove)
- Drive wheels are automatically locked when unit is de-energized, making the gate pry-resistant
- Clearly illustrated installation, maintenance, and trouble-shooting instructions
- Linkage-type quick-action hand release for manual operation
- Limited 5-year factory warranty

MODELS AVAILABLE

NXL-15vp

- Standard model
- Travel speed: 1.2 fps
- Recommended gate opening: to 50 ft
- Rated pull: 300 pounds

NXLR-15vp

- Rack-and-pinion drive model
- Travel speed: 1.4 fps
- Recommended gate opening: to 50 ft
- Rated pull: 300 pounds

NXL-15vp-HS

- Standard high speed model
- Travel speed: 2.2 fps
- Recommended gate opening: to 50 ft
- Rated pull: 300 pounds
- Soft start / stop standard

NXLB-13vp

- Standard Battery Backup model
- Travel speed: 1.2 fps
- Recommended gate opening: to 50 ft
- Rated pull: 200 pounds
- Maintains normal operation during power failures
- *Not available in 3Æ primary power*

NXL-20vp-HD

- Standard heavy-duty model
- Travel speed: 1 fps
- Recommended gate opening: to 75 ft
- Rated pull: 400 pounds
- Soft start / stop standard
- *Not available in 110v 1Æ*

NXLB-13vp-HS

- High Speed Battery Backup model
- Travel speed: 2.2 fps
- Recommended gate opening: to 50 ft
- Rated pull: 200 pounds
- Maintains normal operation during power failures
- *Not available in 3Æ primary power*

NXLD-20vp

- Extra heavy-duty model (four hydraulic motors)
- Travel speed: 1 fps
- Recommended gate opening: 150 ft
- Rated pull: 500 pounds
- Soft start / stop standard
- *Not available in 110v 1Æ*

XLT-30v3

- Super heavy-duty model (six hydraulic motors)
- Travel speed: 1 fps
- Recommended gate opening: 300 ft
- Rated pull: 700 pounds
- Soft start / stop standard
- *Not available in 1Æ primary power*

OTHER MODELS

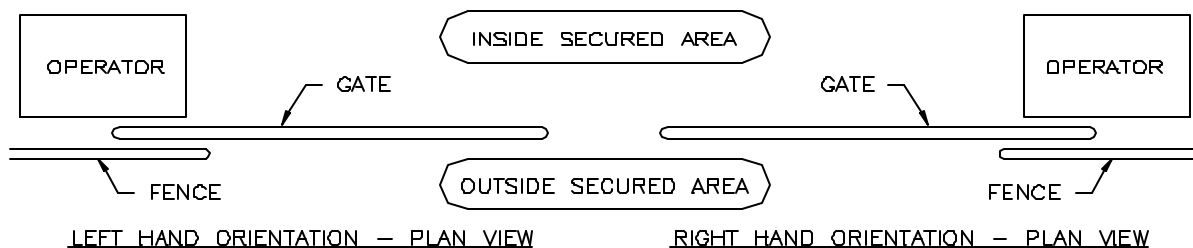
B&B also manufactures many other types of operators, as well as related product lines, and is continually developing new products. More than 50 types of aluminum gates are also manufactured at B&B. Contact the factory or an authorized representative of B&B for more information.

INSTALLATION

Before you begin: Read all installation information before beginning work. Study all pertinent drawings. Be certain to refer to the correct wiring diagrams for your operator model. Knowledge of standard construction procedures is assumed. Electrical work should be done by qualified electrical technicians.

1. Identify your operator model. Write the model number and serial number on the lower left hand of the cover sheet of this handbook in the spaces provided for easy future reference. The information is on a stamped tag attached to the outside of the operator housing. be sure to include the complete model number, which identifies operator configuration, horse power, supply voltage required, and motor phase. The model number is XL_____-_____-_____. If multiple operators are installed at this location, record information which will permit identification of each operator's model and serial number.

2. Refer to the installation drawing, page 3-2 for most operators, for complete structural installation details. If your gate is an XLT refer to page 3-3, or an XLD refer to page 3-4. Note the left hand / right hand orientation of the gate.



3. Install the gate. Installation of the gate depends on the gate and mounting design. Obtain assistance from the gate manufacturer if required. It is critical that the gate move freely and easily over its full travel without binding. Gates which cannot be easily opened will place undue stress on the operator, reducing the life of the operator and the gate especially in high-speed operator installations. Operators are designed to provide convenience and safety, not to force a gate open or closed.

NOTE: Gates requiring more than 25% of the operator's rated draw force may experience slipping in wet conditions.

IMPORTANT: A requirement for NXLR installations and a recommendation for other models is that the gate must be guided within 3 feet of the operator by guides which permit no more than 1/4 inch movement in or out from the operator. This can be accomplished with bottom guides or cantilever rollers. It is important that this be done before installing the operator.

4. Splice the drive rail. The drive rail length is the gate opening plus at least 4 feet. Add at least 6 feet for the NXLT operator. If you have chosen to locate the operator further back from the opening than the minimum shown on the installation drawing, be sure to lengthen the drive rail by the additional setback. If more than 24 feet of drive rail is required, or if multiple pieces of drive rail are used, the drive rail must be spliced using the splice kit provided. The manufacturer recommends that the drive rail run the entire gate length in order to dissipate vibration and shock loading. For standard rail, refer to the drive rail drawing on page 3-5. If installing an NXLR, see page 3-6 and page 3-7.

5. Lay the electrical conduit according to the site plans and appropriate codes. Note the location of the conduit entrance in the operator housing for the best stub-up location. **Power and control wiring are to be run in separate conduits.**

6. Pour a concrete pad for the operator. Minimum dimensions are provided on the appropriate installation drawing (see section 3). Allow 24 hours for the concrete to cure before using the gate operator. Note: In unusual circumstances where the gate travels on a sloped path, the pad surface should slope with the gate path as closely as possible for best operation.

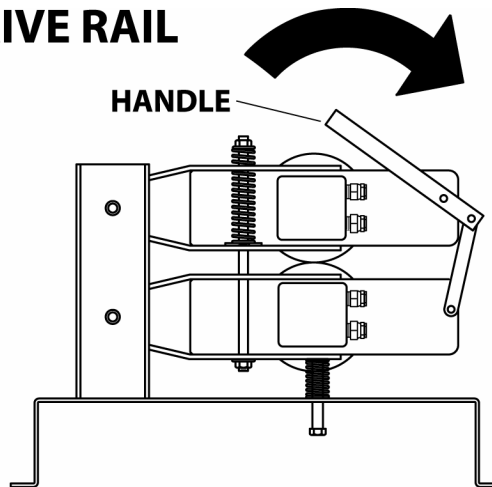
7. Locate the operator on the pad. **The operator frame must be adjusted so that the drive wheels are parallel to the gate,** with the center of the drive wheels 3 inches from the closest face surface of the gate. A quick and accurate method for accomplishing this is to attach clips to each end of the gate with a string tied between them 3" out from the face of the gate. Use the operator as a template for locating the anchor bolts. See the appropriate installation drawing for anchor bolt requirements.

NOTE: Bowed or warped gates must be straightened or replaced. If a straightened bow remains somewhat warped, place the operator with the drivewheels 3" from the closest point on the gate. Shim the drive rail as needed where the gate bows away from the operator to keep the rail straight and parallel to the gate travel.

8. Release the drive wheels. Remove the housing cover. Pull the quick release handle back to release tension on the drive wheels.

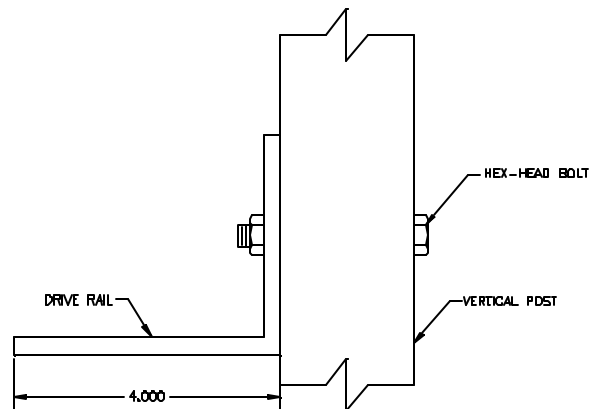
Caution: The quick release design holds the wheels apart, but it is not locked in this position. Bumping the mechanism or jarring the operator can cause the mechanism to snap back to the clamped position. Always keep fingers etc. clear of the mechanism path to avoid injury.

**TO RELEASE DRIVE RAIL
PULL HANDLE**

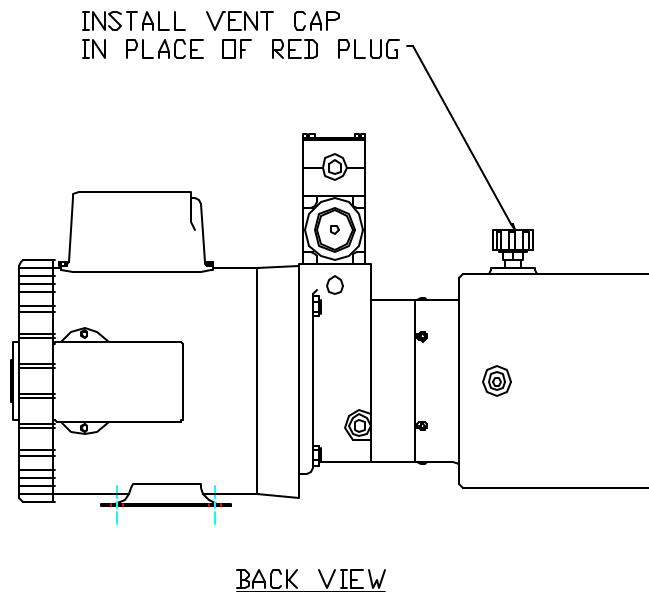


9. Mount the drive rail on the gate. Mounting will vary depending upon the gate style. The manufacturer recommends using hex head bolts to attach the drive rail to the gate. Drill through the gate's vertical post and the 3" vertical side of the drive rail. Bolt the rail to the vertical post. The 4" horizontal part of the drive rail should pass between the wheels, maintaining the correct height at the wheels over the full travel of the gate.

NOTE: This might not be level or parallel with the bottom of the gate because of an uneven or irregular roadway or gate track. The horizontal portion of the drive rail should be parallel with the surface of the mounting pad to prevent undue stress (refer to the above illustration). Shim as needed to keep the rail straight (refer to step 7). For the XLR, see page 3-7.



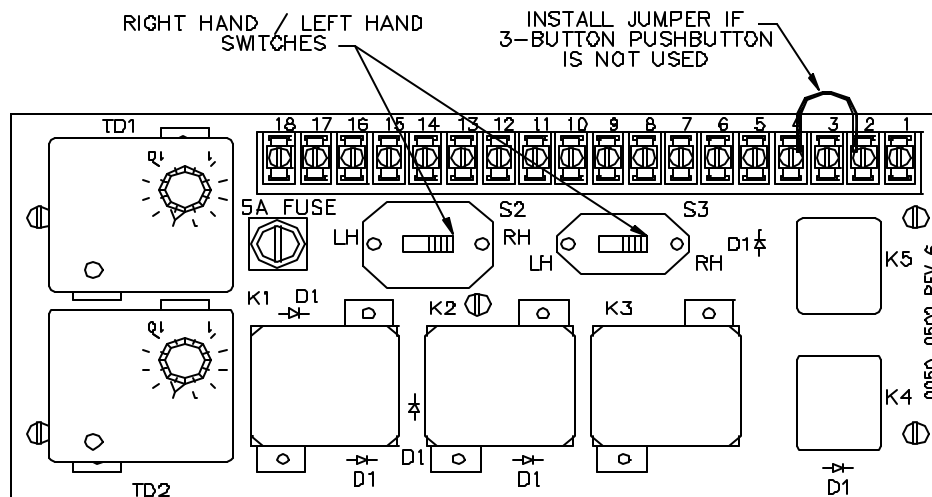
10. Install the vent cap in the pump unit. Remove the red shipping plug and replace it with the vent cap, which is shipped attached to one of the hydraulic hoses with a wire tie. Failure to do so will damage the operator, and will void the manufacturer's warranty.



11. Move the proximity limit switch out 3/4 of an inch. The proximity limit switch has a metal sensitive area approximately 3/4 of an inch long. Unscrew the limit switch from its shipping position flush with the casing. See drawing 0050BA0203 page 3-9 for high speed or rack and pinion operators, and 0050BA0201 page 3-8 for standard speed operators.

IMPORTANT: Steps 12 through 18 should be completed by a qualified electrical technician.

12. For left hand gate installations, change both toggle switches inside the control enclosure to the left hand position marked on the prewired relay board. No wiring changes, limit switch swapping, or hose swapping is required. Refer to the illustration below.



13. Install a jumper wire between terminals 2 and 4 if a three button push-button or other "stop" contact is not to be used. The jumper must be installed or the gate will not operate. Install the jumper when the push-button is disconnected. See illustration above.

14. Run and connect all power and control wiring according to national and local codes. Power and control wiring must be run in separate conduits.

Refer to the wiring specifications chart 0050BL0053 on page 4-1 to choose the correct wire gage. the wiring charts take both the motor's full load amperage into consideration and the amperage needed to power peripheral equipment required for a complete gate system. Locate the correct wiring diagram for your gate model and supply power in section 4 of this handbook and mark it clearly. The correct wiring diagram for your gate is also located inside the lid of the control enclosure.

Proper grounding of the unit is required. This is accomplished by connecting a ground wire between the ground terminal inside the disconnect switch housing and a copper ground rod located as close to the operator as possible. It is important that an earth ground be used, and not an electrical ground.

15. If the gate must be converted to an alternate supply voltage, refer to the voltage conversion drawings for single phase operators (0050AE0009 and 0050AE0069, p. 4-2 and 4-4) or for three phase operators (0050AE0010 and 0050AE0069, p. 4-3 and 4-4), as appropriate.

NOTE: Battery Backup and Fail Safe operators are not set up for field conversion of primary power.

Make necessary wiring changes at the control transformer and electric motor. Electric motor wiring for the various voltages is usually stamped on the motor, and should always be checked. The motor is to be run counterclockwise in all operators. The wiring is subject to change by the motor manufacturer, and changes may not be reflected in this handbook.

NOTE: Most NXL series operators use motors with built-in overloads. If your operator has overloads located in the electrical enclosure, contact technical support for rewiring assistance.

NOTE: If the supply voltage is low, it is recommended that the low voltage taps (104V, 208V, or 416V) provided on the control transformer be used.

16. Test run the operator. Make sure the drive wheels are disengaged before connecting the power.

NOTE: If three phase power is used and the motor runs but the drive wheels do not turn, reverse two poles (swap two wires) of the three phase power source. If the operator cuts off unexpectedly, refer to step 20.

Test the "open" function by momentarily jumping terminals 1 and 4, or pressing the open button. The wheels should turn counter-clockwise. Stop the gate by pressing the stop button, manually activating the open limit switch (using a small metal plate) or disconnecting the power.

Test the "close" function by momentarily jumping terminals 4 and 3, or pressing the close button. Stop the gate by either pressing the stop button, manually activating the close limit switch (using a small metal plate), or disconnecting the power.

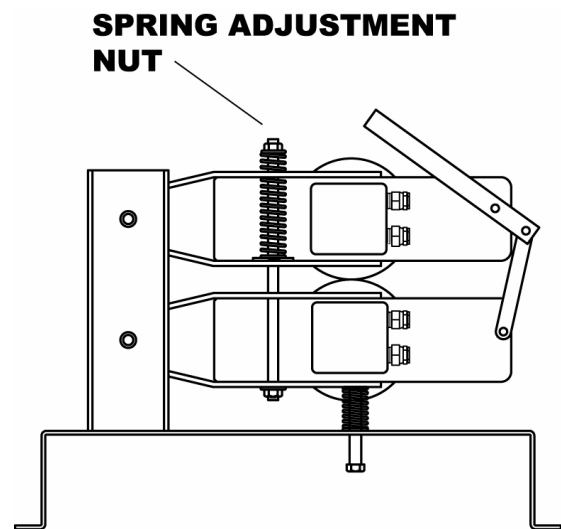
Test the instant reverse feature by first momentarily jumping terminals 4 and 3 (giving a "close" signal), then momentarily jumping terminals 1 and 4 (giving an open signal). For safety reasons, the circuit is designed to prevent the instant reverse feature from working while the gate is opening. During the open cycle, the gate must be stopped, and then reversed.

17. Connect and test accessory controls. Refer to the accessory wiring diagram on page 4-9, or to the master-slave wiring diagram on page 4-10.

18. Check limit switch alignment. Manually push the gate to its fully open and fully closed position and verify that the proximity limit switches are 1/4" from the trip plate surface. Adjust the limit switches until this distance is reached.

IMPORTANT: The minimum distance between the limit switch and the housing is 3/4". Less distance will cause the limit switch to give a false indication.

19. Engage the drive wheels. Engage the drive wheels by carefully pushing the quick-release handle back to the original position, keeping fingers clear of pinch points. Repeat the gate function tests (steps 16 and 17). Be sure the gate does not bind and the drive rail remains aligned between the drive wheels during full travel. If the wheels slip, tighten down on the spring adjustment nut until no slippage occurs during normal gate travel. Momentary slippage when starting, stopping, or reversing is acceptable. Tighten the spring only enough to eliminate slippage during normal travel. Over-tightening will shorten the wheel life. Refer to illustration.

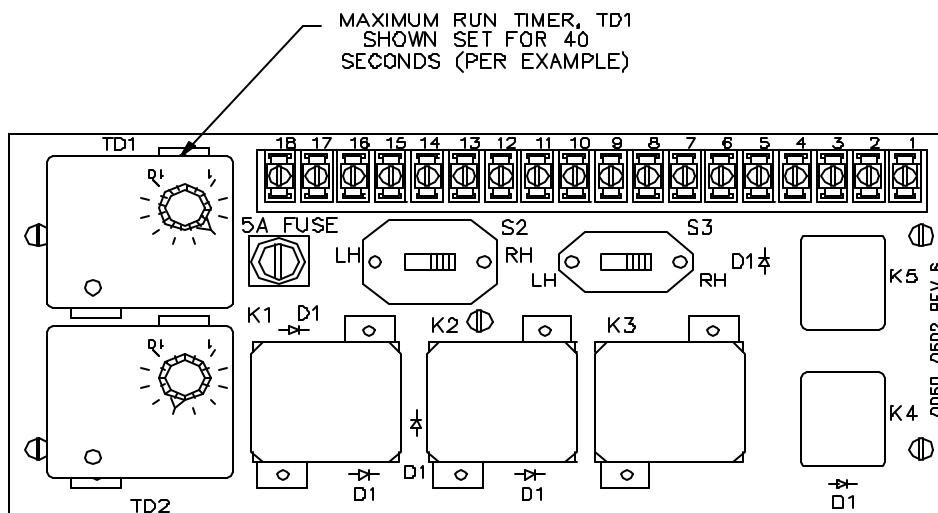


Special note for NXLR installations: To adjust the spring setting, release the drive mechanism (wheel and pinion) with the quick release. Place the rail / rack between the wheel and pinion, aligning the gear teeth. Return the quick release mechanism to the "engaged" position, sliding the gate a bit if necessary to obtain a good mesh between the rack and pinion. If the teeth fully engage, loosen the spring until a slight gap is seen. Tighten the spring adjustment nut just until the teeth are fully meshed, then tighten the

spring an additional 2 to 3 full turns. **Do not over tighten.** The spring holds the rack and pinion engaged, overtightening does not increase the pull capacity, and will result in excessive wear and grinding of the teeth.

20. Set the maximum run timer. Measure the time required to run the gate through a complete cycle (open and closed) and set the maximum run timer to slightly longer than this time. The maximum run timer is the time delay labeled TD1 on the pre-wired relay board inside the electrical enclosure. Each number on the timer represents 10 seconds.

For example, if a complete cycle requires 35 seconds, 18 seconds to open and 17 seconds to close, the knob pointer on TD1 should be set on 4, for 40 seconds maximum run time. Refer to the illustration.



NOTE: If the maximum run timer times out, the power to the operator must be turned off and back on to reset the timer. This prevents the operator from attempting to run every time it receives an "open" or "close" signal when the gate is stuck or jammed. An alternate, multiple-range maximum run timer (TD1), similar in appearance to that shown, may be provided on NXLD and NXLT models to permit maximum run times greater than 100 seconds for unusually long gate openings.

21. If the drive rail is fastened to the gate with U-bolts or by another method which could allow the rail to move (if the gate were jarred for example), the use of a positive fastening device is recommended. Small holes should be drilled through the drive rail into the vertical members of the gate, and self-tapping screws used to lock the rail into position.

22. Warning signs should be mounted in a visible location per applicable safety codes instructing traffic to maintain a safe distance clear of the gate path.

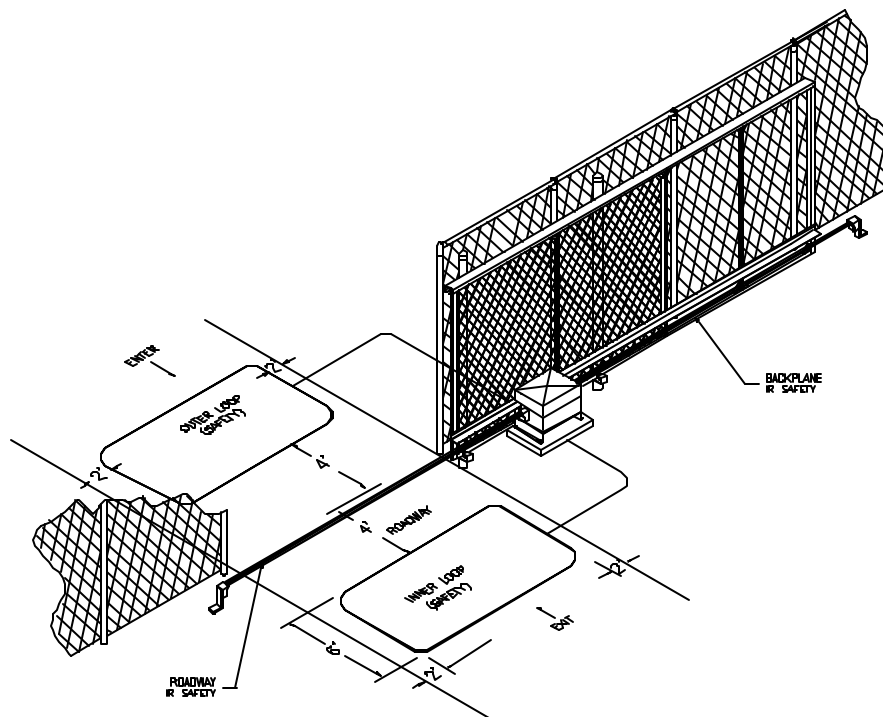
23. Installation of positive gate stops is recommended. They should be 1 or 2 inches past the normal travel of the gate.

24. Record the names and phone numbers of the dealer, installer, and other important contacts, in this handbook.

25. Leave the handbook, along with any supplements, with the owner. Have them keep these materials in a place where they will be readily available for future maintenance, control modifications, trouble shooting, etc. If additional handbooks are needed, contact your dealer or an authorized B&B ARMR distributor.

ADDITIONAL SAFETY ADVICE FOR AUTOMATIC OPERATOR INSTALLATION

1. A safety loop, or some other presence-detecting safety device, is advised for all automatic gate operator installations. One should always be used with high-speed operators. Safety devices which reverse the gate on contact with an obstruction (gate mounted safety edges, for example) are not recommended as primary safety controls.
2. Two safety loops, one on each side of the gate, are advised when a timed gate closure is installed (TD-2). This will ensure that the vehicle completely clears the gate before it begins to close.



3. High speed operators (2 fps or more) are not recommended for pedestrian access installations.

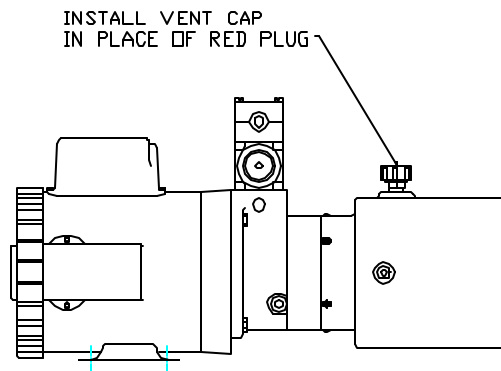
4. For safety and for best operator service, the gate design should consider the large kinetic energy (potential impact force) associated with high-speed operation. Kinetic energy is directly proportional to the velocity squared. For example, a gate traveling 5 feet per second has 25 times the momentum it would have traveling at 1 foot per second. Thus, the lowest operational speed practical should be chosen for each gate installation.

5. To reduce kinetic energy at the chosen operating speed, the gate should be as lightweight as possible. Gates made from aluminum are preferable to those made from steel.

MAINTENANCE

HYDRAULIC SYSTEM

1. Remove the vent / fill plug and check the fluid level. Keep the fluid level within 1" of the vent plug. Use Exxon Unis #J-26 hydraulic oil, Texaco aircraft oil 15, Mobile DTE 24, or an equivalent. If another good grade of hydraulic oil is substituted, Dextron II automatic transmission fluid, for example, can be substituted in warm climates; the old oil must be drained first to avoid mixing. **Never mix hydraulic fluids.**



2. Hydraulic fluid requires infrequent replacement. The frequency of fluid replacement is highly dependent upon operating conditions. The oil's operating temperature, which is determined by a combination of outside air temperature, number of cycles, gate length, pressure required to move the gate, and so on, is the most critical factor in determining oil life. Replace the oil any time it becomes dark, discolored, contaminated with small trash particles, or opaque.

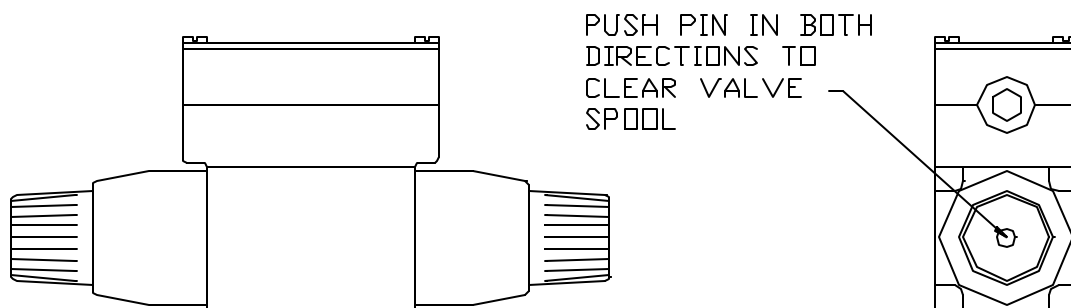
As a general guide, on high cycle installations (300 or more cycles per day) replace the fluid at least every 2-3 years. On other installations, replace the fluid every 3-5 years.

3. Check for leaks in hydraulic lines and fittings. Leakage could occur in fittings after a period of use. If it does, moderate tightening of the hose fittings should stop the leakage. If the leak persists, replace the hose assembly.

4. Always operate the gate several times after adding fluid to expel any trapped air. Recheck the fluid level.

5. Check the condition of the drive wheels. Look for large cracks or pieces of polyurethane (rubber-like tread) which have broken off. Drive wheels require periodic replacement under normal service when the polyurethane begins to crack or become out-of-round. Over tightening the wheel clamping spring will shorten wheel life. See page 2-7 instruction 19 for information on spring adjustment.

6. The 4-way hydraulic valve could occasionally stick if lint or other debris gets trapped in the valve spool. Manually shifting the valve spool in both directions several times will usually clear this problem. This is done by pushing the small pin in each end of the solenoid coil. See the following illustration.



RACK AND PINION (XLR) OPERATORS ONLY:

1. The teeth of both the rack and pinion gear must be lubricated every few months with either Texaco Molytex EPZ, or Exxon Ronex Extra Heavy Duty Moly. It should be done more often under high use or harsh conditions.

ELECTRICAL CONTROLS:

CAUTION: TURN OFF POWER BEFORE SERVICING

1. No regular maintenance is required on electrical gate controls. Refer to trouble shooting section if a problem occurs with gate controls.
2. Keep controls clean and dry.

TROUBLE SHOOTING SYMPTOM GUIDE

IMPORTANT:

1. Servicing of the gate controls should only be done by experienced electrical technicians.

Many safety features have been built-in to protect service personnel. However, as with any electrical equipment, severe injury from electrical shock or damage to control components can result from improper servicing of the controls.

2. Always disconnect power before servicing any electrical component.

3. All voltages must be checked under load, i.e. with operator running or attempting to run.

A. The power unit runs, but the wheels do not turn.

1. Check the fluid level. Maintain the fluid to within 1" of the vent cap with Exxon Unis #J-26 hydraulic oil, Texaco aircraft oil 15, Mobile DTE 24, or equivalent. It is important to completely drain the old oil. Do not mix oils.

2. Reverse two legs of three-phase power source.

3. If the operator has undergone a field conversion to accept an alternate supply power, check the motor wiring to be sure it is wired correctly for counterclockwise rotation.

4. Manually operate the 4-way valve several times by pushing the pins in the center of the solenoid coils back and forth. See instruction 6, and the illustration on page 2-13 in the maintenance section for assistance in identifying the solenoid valve and pins.

5. Check the control circuit voltage between terminals 13 and 4 with the operator attempting to run. The voltage must be between 24 and 32 volts for reliable operation. If the measured voltage is close to 24, transient voltage drops could fall significantly below 24 volts. The motor contactor and the relays will not function reliably when the

voltage drops too low. If the control voltage is too low or is marginal:

a. check the supply voltage at the source. If the supply voltage is below 110/240/480 VAC, contact the utility company to correct the problem, or use the alternate low voltage taps on the control transformer (104, 208, or 416 volt taps). Refer to the transformer wiring diagrams on page 4-4.

b. measure the total distance between the power supply and the operator. Refer to the wiring specifications chart on page 4-1 to check the wire gage required to avoid excessive voltage drop. Follow the chart recommendations. Use the next larger size wire gage if the supply voltage is marginal for the distance required. If the problem can not be corrected, use the alternate low voltage taps on the control transformer (104, 208, or 416 volt taps). Refer to the transformer wiring diagram on page 4-4.

6. If the above steps do not solve the problem, check the hydraulic pressure by inserting a pressure gauge into the pressure port. The pressure port is located at roughly 12 o'clock on the pump section of the power unit (the "neck" section). The plug can be removed with a 5/16" Allen wrench. The port accepts 3/8" male pipe threads. With the gate attempting to run, measure the pressure and note the pattern of pressure build up, if any. Record this information and call for technical support (see page 2-31)

B. The power unit runs and the wheels turn, but the gate does not move.

1. Check the gate for free movement. Remove the housing cover and release the drive wheels by slipping the quick release handle over the base and rotating the handle until the linkage snaps into place as per page 2-3. Pull the gate manually through the full travel in both directions to be sure there is no binding.

2. If the gate slides freely, check the drive wheel spring tension. for normal applications, with the exception of NXLR installations, the nut should be flush with the end of the threads, or up to 1/4" of the threads on the spring bolt should extend beyond the nut. (See note on page 2-7 instruction 19 for the XLR)

3. Check the drive rail for ice, oil, or slick spots. Clean the rail if oil or some other slick

deposit is causing the problem. If the problem is ice, try tightening the spring pressure on the drive wheels to crunch through the ice. Aluminum drive rail is recommended for icy installations, because ice on a slick aluminum surface shatters and falls off more easily than ice on a textured surface like galvanized steel. The XLR is recommended where extreme environmental conditions reduce traction to nearly zero for friction drive mechanisms.

4. If the above steps do not resolve the problem, check the hydraulic pressure by inserting a pressure gauge into the pressure port. The pressure port is located at roughly 12 o'clock on the pump section of the power unit (the "neck" section). The plug can be removed with a 5-16" Allen wrench. The port accepts 3/8" male pipe threads. With the gate attempting to run and the wheels locked or held back, measure the pressure and note the pattern of pressure build-up, if any. Record this and call for technical support (see page 2-31).

C. The gate does not fully open or fully close.

1. Check for gate obstructions or binding.

2. Check the setting of the maximum run timer (TD1). Refer to page 2-8, instruction 20 for instructions on setting the timer.

NOTE: If the timer has timed out, recycling power (switching the disconnect switch off and back on) to the operator will reset the timer.

3. Check for a loose drive rail on the gate and correct it if necessary.

4. Note the ambient temperature. Does the operator resume normal operation if the disconnect switch is switched off and then back on? If the gate is running too slow due to an extremely low ambient temperature, the maximum run timer could be tripping off before full travel is completed. To check this, note the setting of the maximum run timer and time the gate for a full cycle (from closed to open to closed). See the installation section page 2-8 instruction 20. If this is the problem, limited compensation can be achieved by increasing the time on the maximum run timer. In cold weather areas where temperatures go below 0°F, the operator cabinet could be heated with an optional heater and thermostat.

NOTE: The maximum run timer can be reset by recycling power to the operator.

D. The gate operator does not cut off immediately when the full opened or closed position is reached.

1. Check the proximity limit switch and stop plates for correct placement. See the installation section (page 2-7, instruction 18) for information.

2. Release the drive wheels by removing the cover and operating the quick-release mechanism. Check for faulty limit switches following the testing procedure given in the installation section (page 2-5,6 instructions 13 and 16)

E. The power unit does not run.

1. Recycle the power. If the gate then operates properly, the maximum run timer (TD1) had timed out. Check to see that the timer is set correctly. Refer to the installation section page 2-8 instruction 20. If the timer is set properly, check the gate for binding or jamming and correct this condition if it exists.

2. Check the incoming power source. Be sure all three legs of the three phase source have power. If the voltage is low, contact the utility company to correct the problem.

3. Check the motor overloads. Most motors used on XL operators have built-in manual reset overloads. The built-in overload is a button on the side of the motor junction box. If the overloads are the manual reset type and are tripped (popped out), reset the overloads (push in to reset). Also check to see that the overload condition was not caused by binding or blockage. If so, correct the condition.

<p>CAUTION: Separate overloads (not built-in to the motor) on three-phase gates open an auxiliary contact in the control circuit to disable the operator, they do not break the power circuit. Three phase operators can be forced to run in an overloaded condition if the contactor is manually held in.</p>

If the operator is a three phase unit with separate overloads, check the amperage draw for its voltage on the Wiring Run Requirements drawing on page 4-1, or on the electric motor's label. Verify that the overload setting is correct. The overload setting should be a little higher than the amperage draw. Set the overload at the minimum if the draw is less than the lowest overload setting.

If the overloads are tripped, correct the situation which caused the overload and reset the overloads to protect the motor before running the operator again.

4. Check the control circuit fuse. If it is blown, have an electrician check all accessory wiring for shorts. Disconnect the power and replace the fuse. With the K1, K2, and K4 relays unplugged and power off, check the six diodes on the printed circuit board. Diodes should have continuity in only one direction. 1000 V, 3 A replacement diodes are commonly available from electronics retailers, and can be replaced in the field with a soldering iron by an electrical technician. Restore power and operate the gate to test.

5. Check the contacts on the motor contactor. If they are burned out, replace the contactor.

F. The gate runs too slowly.

1. Check the gate for ease of movement. Release the wheels and manually operate the gate, making sure there is no binding and the gate moves freely over its full travel in both directions.

2. Note the ambient temperature. If the ambient temperature is at or below 0 °F, heat the operator cabinet with an optional heater and thermostat.

3. Check the wheels for slipping. Refer to the installation section page 2-7, instruction 19 for adjustment instructions.

4. Check for restriction of the pump intake. Remove the mounting bolts holding the power unit down. Rotate and tilt the power unit to drain the oil from the reservoir. Remove the mounting fasteners around the "neck" of the power unit which hold the reservoir on the pump. Slide the reservoir off. Check the pickup line and screen for blockage or restrictions. The pickup line comes out of the pump and turns down into the fluid. Reassemble the power unit and add clean fluid.

5. Check the hydraulic pressure by inserting a pressure gauge into the pressure port. The pressure port is located at roughly 12 o'clock on the pump section of the power unit (the center section or "neck"). If the pump produces less than 1200 psi with the wheels locked or held back, the relief fitting may require adjusting.

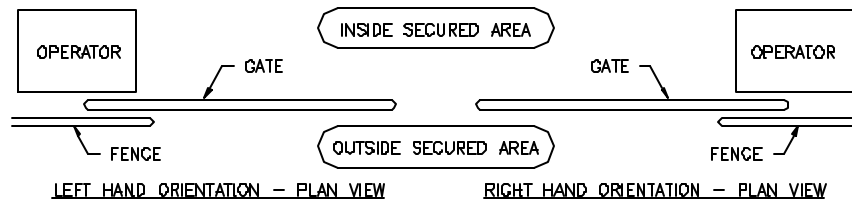
Release the drive wheels from the drive rail with the quick-release mechanism. As a double check, operate the gate with the wheels released. If the wheels now turn at normal speed, adjust the relief fitting. Locate the relief fitting on the side of the pump (center or "neck" of the power unit). Lock or hold back the wheels. Gradually tighten the relief fitting screw a fraction of a turn at a time, observing the pressure gauge as the fitting is tightened. As soon as the gauge reads above 1200 psi, stop tightening the relief fitting. Re-engage the drive wheels and observe the gate operation. The drive wheels should turn counter-clockwise.

NOTE: The factory setting of the relief valve can be approximated by bottoming out the screw, then backing it out two full turns. This approximation should only be used for temporary adjustment in emergencies when a pressure gauge is not available. Re-check and adjust the operator with the aid of a pressure gauge as soon as possible.

<p>IMPORTANT: Overtightening the relief fitting can result in damage to the operator. Therefore, proceed with the caution when adjusting the relief fitting. Never bottom out the screw. If small adjustments of the relief fitting do not appear to be making a difference, contact your dealer or call technical assistance.</p>

G. The gate opens and then will not close.

1. Check the right-hand / left hand selector switch settings. Both switches must be set for the proper hand. The operator's hand is the side of the gate on which the operator is located, when looked at from the outside of the secured area.



H. The gate stops functioning or functions erratically.

1. Recycle the power. If the gate then operates properly, the maximum run timer has timed out. Check to see that the timer is set correctly. Refer to the installation section on page 2-8, instruction 20. If the timer is set properly, check the gate for binding or jamming and correct this condition if it exists.
2. With the operator running (or attempting to run), check the control voltage between terminals 4 and 13. The voltage must be between 24 and 32 V for reliable operation. See page 2-15 section A step 5 for corrective actions.

I. Remote push-button or other remote device does not work, or functions erratically.

1. Check the wiring specifications chart (p.4-1) to verify that the correct gage wire was used for the distance required. Rewire it if needed, or see step 2.
2. Compare the 24 VAC power between terminals 2 and 16, and 4 and 16. There should not be more than a 2 volt difference between the terminals. This test should be run when the unit is not running, and again when it is running. See accessories and options wiring on page 4-9.

J. The motor contactor "chatters":

1. See page 2-15, section A, step 5 to check for and correct voltage problems.
2. Check the contacts on the motor contactor. If they are burned out, replace the contactor.

TROUBLE SHOOTING CONTROL COMPONENT LOGIC

This section and the two sections following (Control Components Key and Functional Schematic) are intended to provide assistance to the electrician / trouble shooter in understanding the basic control circuit.

<u>COMPONENT</u>	<u>FUNCTION</u>
K1 Relay:	The K1 relay energizes the appropriate solenoid coil to open the gate, energizes the motor contactor, seals itself in and locks K2 out. Only an interruption of power or activation of the full open limit switch will drop out K1
K2 Relay:	The K2 relay energizes the appropriate solenoid coil to close the gate, energizes the motor contactor and seals itself in. An interruption of power, activation of the full close limit switch or energizing K1 will drop out K2
K3 Relay:	The K3 relay enables single button controls to provide the correct signal (either open or close) to the gate. The K3 relay is energized any time the gate is fully open (any time the open limit switch is tripped). The open solenoid coil is disabled while K3 is energized. If K5 is energized (contact between terminals 4 and 5 is closed, i.e. a single button control is pressed) while K3 is energized, K3 seals in until K5 is de-energized (contact between terminals 4 and 5 is opened, i.e. the single button control is released).
K4 Relay:	The K4 relay energizes K1 to open the gate for obstruction detectors, safety loops, free exit devices, etc. If no accessories are used which are wired between terminals 6 and 17 or between terminals 6 and either 13 or 14 (13 and 14 are common), K4 will never be energized. When energized, K4 also resets the time delay to close relay TD2.

NOTE: For safety purposes, accessories wired between terminals 6 and 17 are disabled while the full close limit switch is activated.

K5 Relay:	The K5 relay energizes either K1 or K2 (proper path is determined by K3) to open or close the gate for single contact accessories wired between terminals 4 and 5. These accessories include single button radios, single button push-buttons, etc. which either open or close the
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
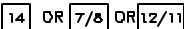














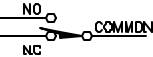

	gate depending upon the gate status when the signal is given.
TD1 Relay:	The TD1 time delay relay is energized each time the motor contactor is energized. If TD1 times out before the motor contactor is de-energized, it breaks power to the rest of the control circuit and seals itself in, preventing further operation of the gate. To restore power to the control circuit, the disconnect switch must be turned off, then back on.

NOTE: The motor contactor does not drop out when the gate is instantly reversed during the close cycle (i.e. TD1 is not reset by an instant reverse command).

TD2 Relay:	The TD2 relay is energized each time the full open limit switch is activated. If TD2 then times out before a close signal is received, TD2 energizes K2, closing the gate. TD2 is reset under two conditions. It is reset each time K4 (safety open) is energized, regardless of gate position. It is also reset anytime the gate moves off the full open limit switch and K3 and K5 are not energized (i.e. when the gate begins to close or, if a single button control is providing the close signal, when the gate moves off the open limit switch and the single button control is released).
Solenoid "a":	The coil labeled "a" will open left-hand gates or close right handed gates when it is energized. In other words, with the gate between you and the operator, which for most applications is standing outside the secured area, looking in, the gate will move to the left when solenoid "a" is energized.
Solenoid "b":	The coil labeled "b" will open right-hand gates or close left-hand gates when it is energized. In other words, with the gate between you and the operator, which for most applications is standing outside the secure area looking in, the gate will move to the right when solenoid "b" is energized.
LS-N:	The limit switch nearer the drive wheels (or the limit switch to the left if standing outside the secure area looking in with the operator behind the gate) is activated (open between terminals 13 and 9 and continuity between 13 and 7) when a right-hand gate is fully open or when a left hand gate is fully closed. (Note: terminals 13 and 14 are common.)
	The limit switch farther from the drive wheels (or the limit switch to the

LS-F:	right if standing outside the secure area looking in with the operator behind the gate) is activated (open between terminals 13 and 10 and continuity between 13 and 8) when a left hand gate is fully open or when a right hand gate is fully closed. (Note: Terminals 13 and 14 are common.
S2:	Switch S2 reverses the function of the solenoids and partially reverses the function of the limit switches (LS-N and LS-F) to switch the operator between right and left hand operation.
S3:	Switch S3 partially reverses the function of the limit switches (LS-N and LS-F) to switch the operator between right and left hand operation.

TROUBLE SHOOTING CONTROL COMPONENTS KEY

PRIMARY COMPONENT	SYMBOL	PHYSICAL LOCATION	RELATED SCHEMATIC SYMBOL(S)	SYMBOL NAME
TOGGLE SWITCH	S2 S3	CONTROL CUBICLE (ON PC BOARD)		TOGGLE SWITCH
TERMINAL BLOCK	E1	CONTROL CUBICLE (ON PC BOARD)		TERMINAL
PUSHBUTTON	O C S	PER CUSTOMER (IF USED)	 	NORMALLY OPEN PUSHBUTTON NORMALLY CLOSED PUSHBUTTON
FUSE	FU	CONTROL CUBICLE (ON PC BOARD)	 OR 	FUSE
TRANSFORMER	T1	CONTROL CUBICLE		TRANSFORMER
SOLENOID VALVE	S _a S _b	MOUNTED ON POWER UNIT		SOLENOID COIL
TIME DELAY RELAY	TD1 TD2	CONTROL CUBICLE (ON PC BOARD)	 OR   	TIME DELAY RELAY COIL NORMALLY OPEN/CLOSED CONTACTS
RELAY	K1 K2 K3 K4 K5	CONTROL CUBICLE (ON PC BOARD)	  	RELAY COIL NORMALLY OPEN/CLOSED CONTACTS
MOTOR CONTACTOR	MC	CONTROL CUBICLE		MOTOR CONTACTOR COIL
LIMIT SWITCH	LS-N LS-F	MOUNTED ON FRONT SERVICE PANEL		SINGLE POLE DOUBLE THROW CONTACT
ACCESSORY CONTROLS	VARIES	CONTROL CUBICLE, ACCESSORIES CUBICLE OR PER CUSTOMER		NORMALLY OPEN CONTACT

XL SERIES OPERATORS FUNCTIONAL SCHEMATIC



TROUBLE SHOOTING TROUBLE SHOOTING WORKSHEET

Before calling for technical assistance, complete the following worksheet. This information will be required to help the trouble shoot the operator. Note: Omit steps 10b through 16 for Battery Backup and Fail Safe operators (denoted by a "B" or "F" in the model number prefix).

1. Complete model number: _____

2. Operator serial number: _____

Note: Model and serial numbers are stamped on a tag located on the operator housing. They should also be recorded on the inside cover of this manual.

3. Control options used:

4. Is the problem consistent? Yes / No

5. Did the gate operate without this particular problem for any period? Yes / No

6. Description / history of problem, including any steps taken to try to correct the problem and the results:

7. Gate hand: RH / LH (See installation instruction 2 for orientation, if required)

8. Maximum run timer setting (TD1):

The maximum run timer, TD1 is the orange box located inside the controls enclosure on the printed circuit board. The TD1 and TD2 timer (if used) can be distinguished by the label on the PC board).

9. Power (nominal or labeled voltage and phase):

10. Place the gate in a mid-travel position so that neither of the limit switches is being tripped. With the power ON use a voltmeter to determine the voltages between the following terminal points. The following steps will be done on low voltage:

NOTE: For operators whose model number includes "B" or "F" (Batter Backup, or Fail Safe), complete only part a., then skip to step 17.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	2-16	24V		Primary power and transformer
b.	2-13	24V		TD1 N/C contact and 5 amp fuse
c.	4-13	24V		Stop function (N/C)
d.	6-13	12V		K4 relay coil
e.	4-5	24V		K5 relay coil

11. Note that the K1, K2 and K3 relays are identical, but can be distinguished by the labels on the printed circuit board just above each socket. Unplug the K2 relay from its socket for the following tests.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	4-3	24V		K1 N/C contact and close solenoid coil
b.	4-17	24V		Close limit switch N/C contact

Return the K2 relay to its socket.

12. Unplug the K1 relay from its socket. for the following test:

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	4-1	24V		K3 N/C contact and open solenoid coil

Return the K1 relay to its socket

13. Note the color of the wires on terminal 11_____and terminal 12_____. Disconnect the wires on terminals 11 and 12. Prevent them from making contact with anything and complete the following tests.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	4-1	12V		K1 coil and open limit switch N/C contact
b.	4-3	12V		K2 coil and close limit switch N/C contact

Return the wires to their appropriate terminal points.

14. Note that the TD1 timer and the TD2 timer (if used) are identical, but can be distinguished by their labels on the printed circuit board just above their sockets. Unplug the TD2 timer (if present) and manually trip the open limit switch for the following tests:

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
		RH / LH		
a.	2-7	24V / 12V		K3 coil and open limit switch N/O
b.	2-8	12V / 24V		K3 coil and open limit switch N/O

Return the TD2 timer to its socket (if used)

15. Add a jumper wire between terminals 13 and 16. Unplug the TD1 timer for the following test:

IMPORTANT: Be sure to remove the jumper after this test.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	4-15	24V		Motor contactor coil
<u>Remove the jumper wire.</u> Return the TD1 timer to its socket.				

16. Disconnect the orange wire at terminal 15. Make sure it cannot touch anything. Complete the following test.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	4-15	12V		TD1 coil
	Replace the orange wire on 15.			

17. With the drive wheels engaging the drive rail, run the operator by jumping between terminal points 4 and 1. Check the control circuit voltage and record it.

	POINTS	EXPECT	ACTUAL	CIRCUIT BEING TESTED
a.	2-16	24V		Power to control circuit under load
	Disconnect the drive wheels from the drive rail so that the next tests do not actually move the gate. Insure that all relays and timers are well seated in their sockets and that power is still on.			

18. Momentarily jump between the following terminal points and note the results.

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	2-1		Did the K1 relay energize?
b.			Did the motor contactor energize?
c.			Did the drive wheels rotate in the proper direction to <u>open</u> the gate?

Trip the open limit switch

- d. Did the K1 relay drop out?
- e. Did the motor contactor drop out?
- f. Did the K3 relay energize while the limit switch was in the tripped position?

19. Momentarily jumper between the following points and notes the results.

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	4-5		Did the K5 relay energize?
b.			Did the K1 relay energize?
c.			Did the motor contactor energize?
d.			Did the drive wheels rotate in the proper direction to <u>open</u> the gate?

Trip the open limit switch again to stop the operator.

20. Momentarily jumper between the following terminals

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	2-3		Did the K2 relay energize?
b.			Did the motor contactor energize?

- c. Did the drive wheels rotate in the proper direction to close the gate?

Trip the close limit switch.

- d. 4-5 Did the K2 relay drop out?
e. Did the motor contactor drop out?

21. With the close limit switch held in the tripped position, momentarily jumper between the following points and note the results.

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	6-17		Nothing is expected to happen
b.	6-13		The gate is expected to open

Release the close limit switch, then trip the open limit switch.

22. With the open limit switch held in the tripped position, momentarily jumper between the following points and note the results.

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	4-5		The gate is expected to close.
Release the open limit switch, then trip the close limit switch to stop the operator.			

23. Momentarily jumper between terminal points 2 and 1 to run the operator. Allow the operator to run until the maximum run timer (TD1) times out and shuts down the

operator. Turn the power off and back on to reset TD1.

	POINTS	YES / NO	WHAT SHOULD HAPPEN
a.	4-1		Did TD1 shut down the operator after the appropriate time delay?

24. Using a pressure gauge, check the pressure at the pressure port with the operator pulling, or attempting to pull the gate. Be careful not to get fingers or loose clothing caught between the wheels. The pressure port is located at 12 o'clock on the pump section of the power unit. The plug can be removed with a 5/16" Allen wrench. The port accepts 3/8" male pipe threads.

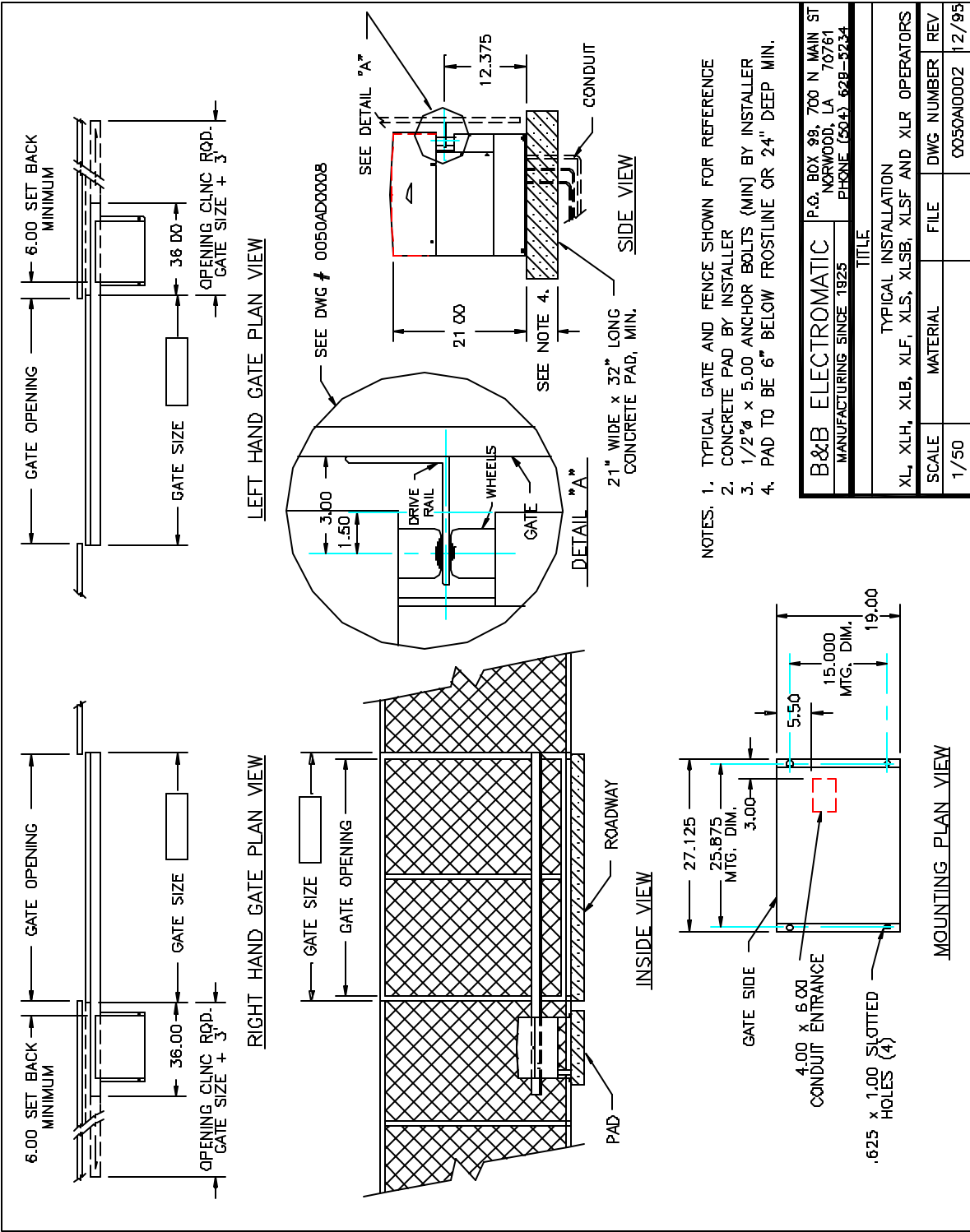
Gauge pressure:

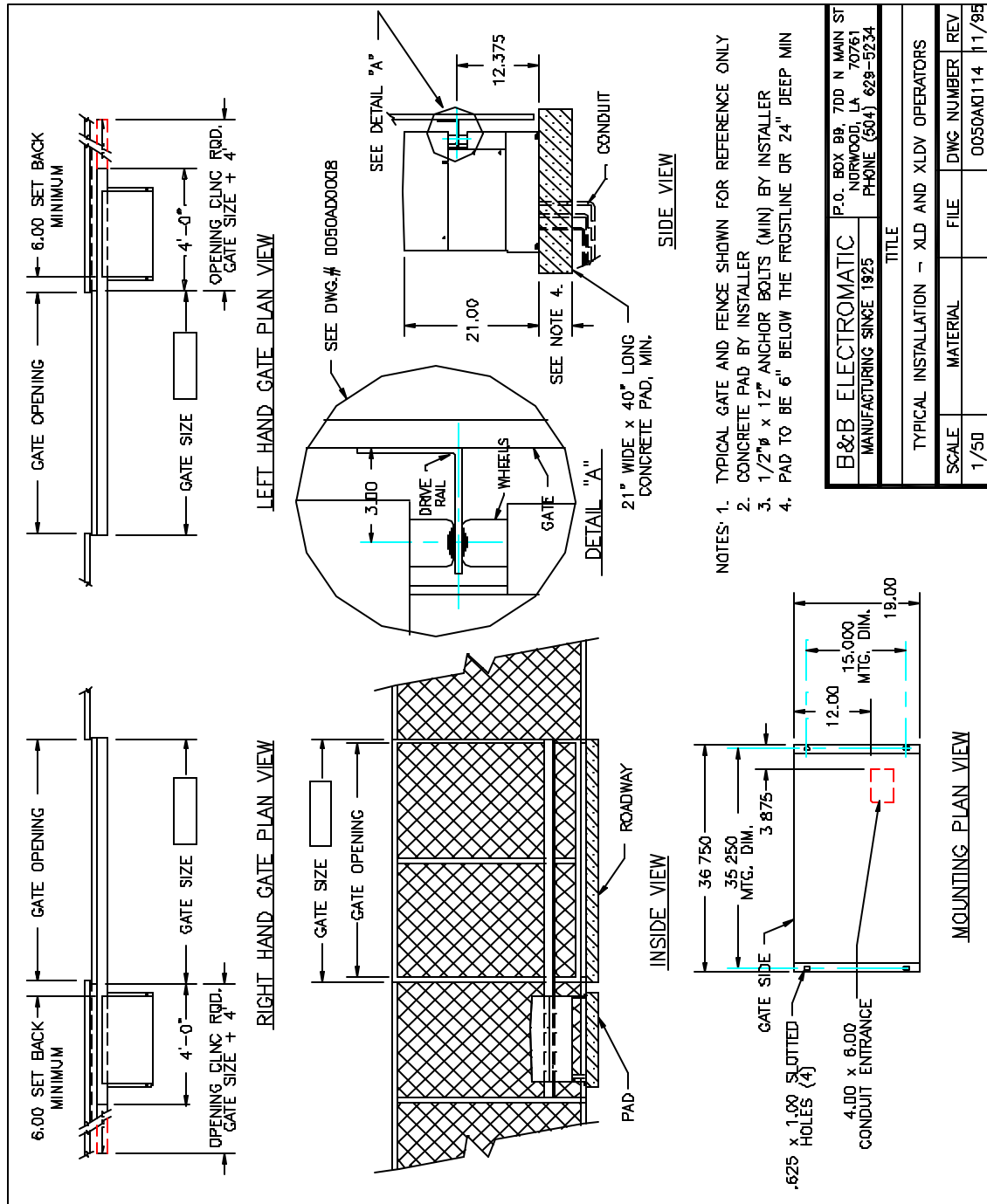
TROUBLE SHOOTING TECHNICAL ASSISTANCE

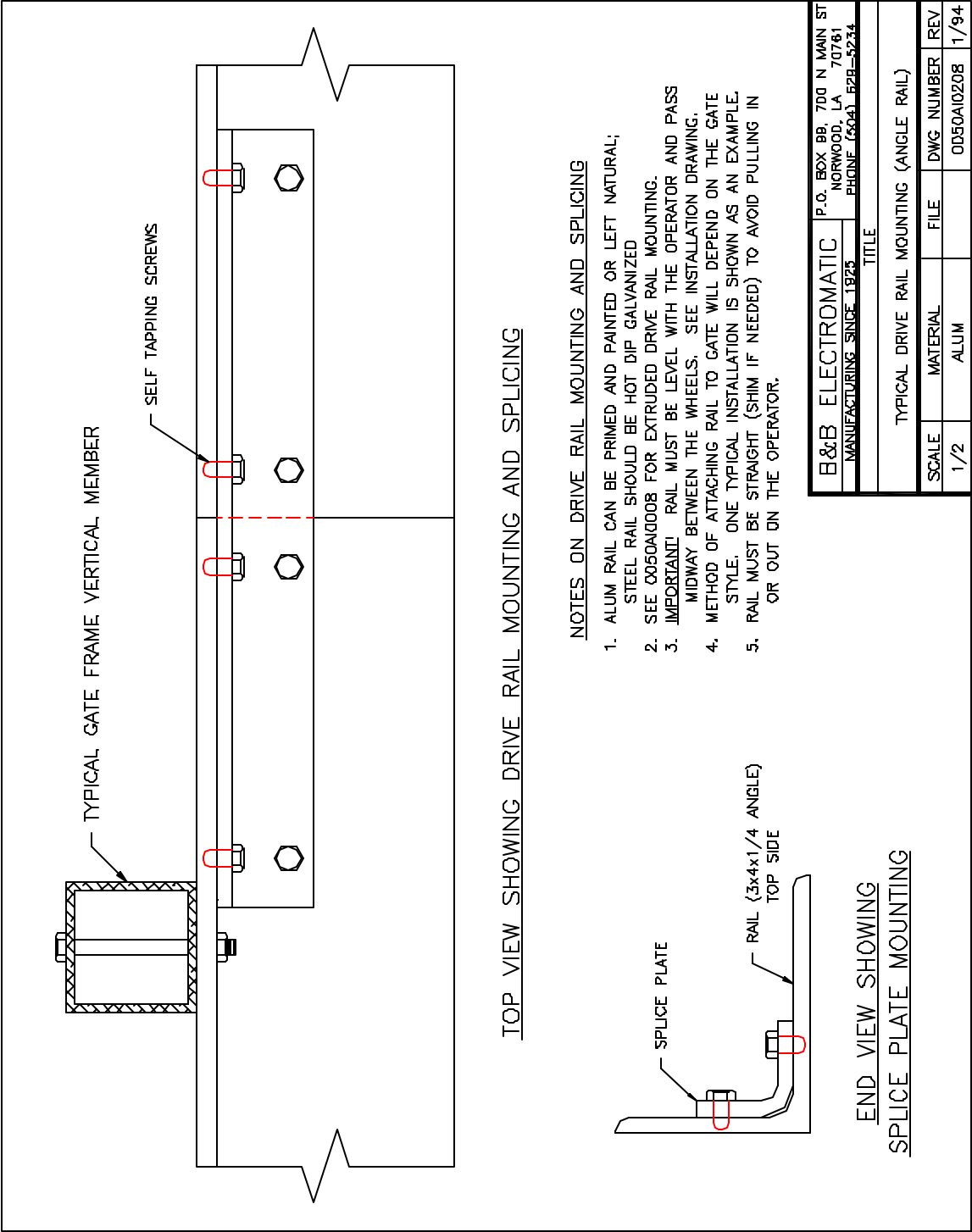
If a problem cannot be corrected using the trouble shooting information in this handbook, or if technical assistance is required, the best first step is to contact your dealer / distributor. If you do not have a dealer, contact B&B Technical Sales at 1-800-367-0387. B&B coordinates nation-wide marketing and support for the XL series operators and can provide you with a list of distributors in your area.

Dealers/installers who require direct technical assistance can call **(800) 367-0387**

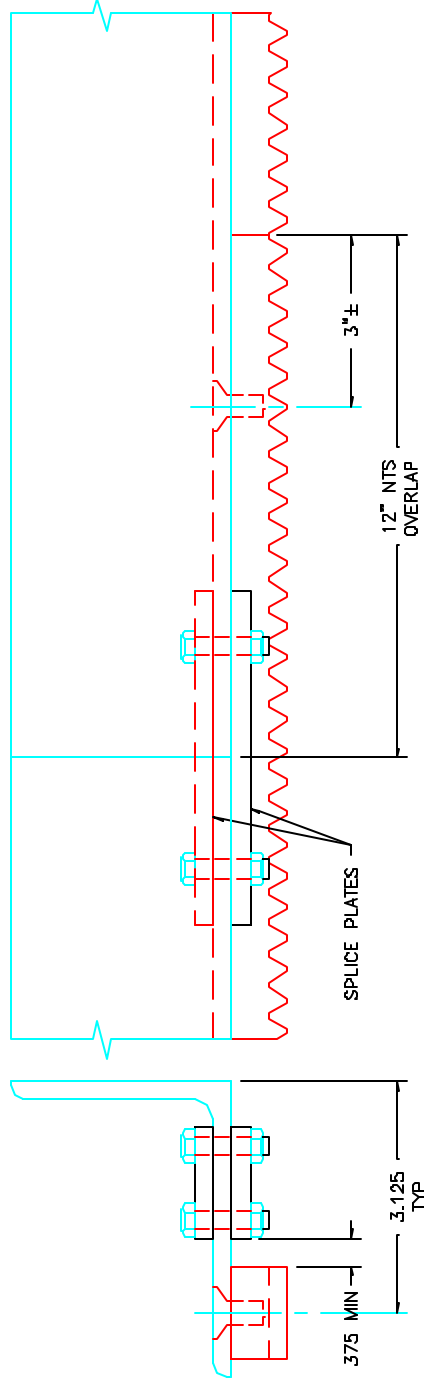
Before you call, please verify that the checks in the SYMPTOM GUIDE (page 2-15) and the TROUBLE SHOOTING WORKSHEET (page 2-26) have been completed to the fullest extent possible. Have this information ready. This information will be required to help trouble shoot the operator. Completing these steps before you call will save you time in the end.



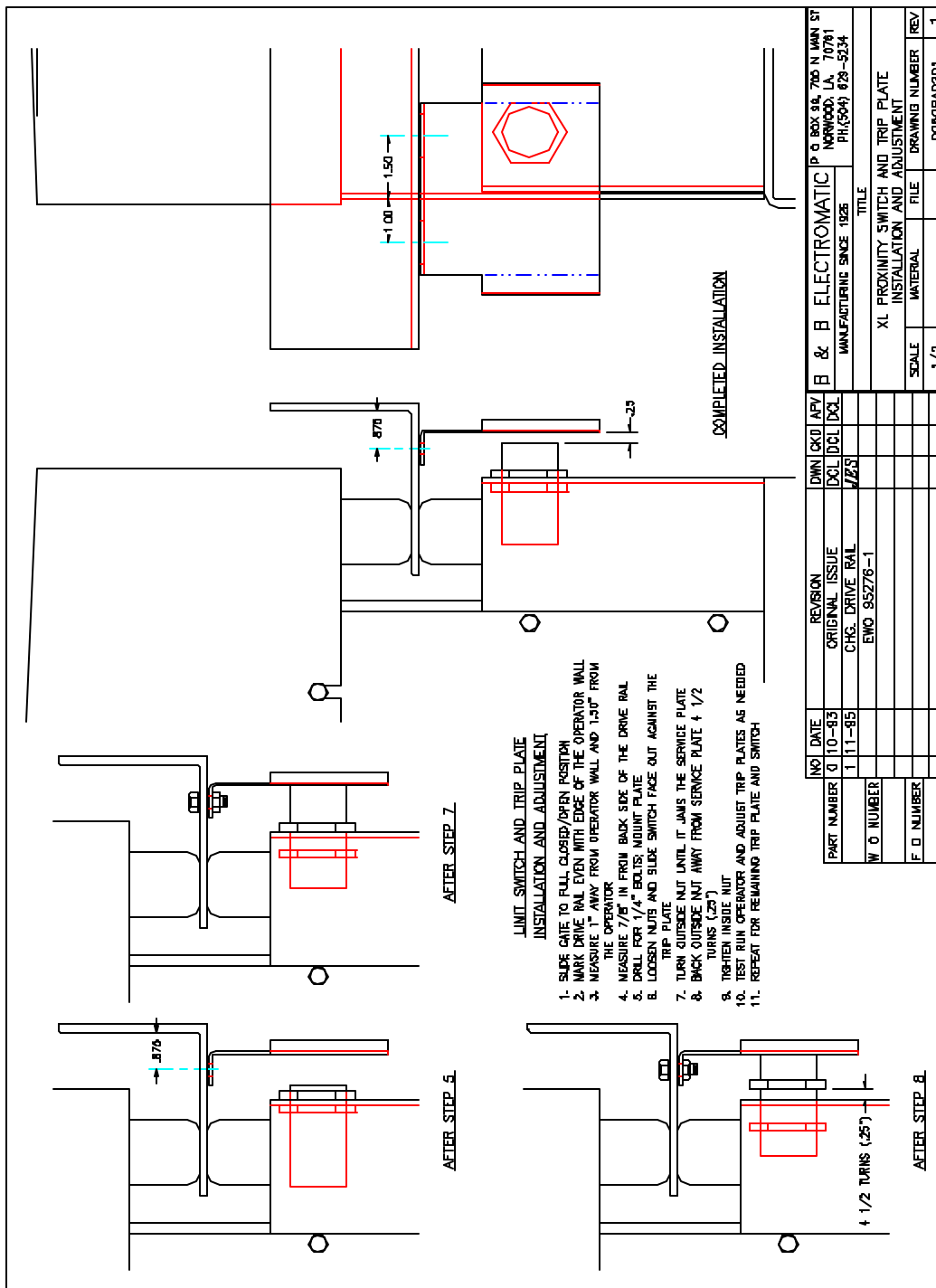




- NOTES: 1. BUTT DRIVE RAIL/RACK TOGETHER, MATCHING BOTH ANGLE AND RACK
 2. IMPORTANT! MAKE SURE TEETH IN RACK MATCH PROPERLY!
 3. USE SPLICE PLATE AS A TEMPLATE TO MARK HOLES
 4. DRILL ANGLE TO CLEAR 1/4" BOLT
 5. SEE DWG 0050AID175 FOR TYP LIMIT SHOE INSTALLATION
 6. SEE 0050CA013D FOR OPERATOR ASSEMBLY
 7. STD XL WIRING & INSTL DWGS APPLY

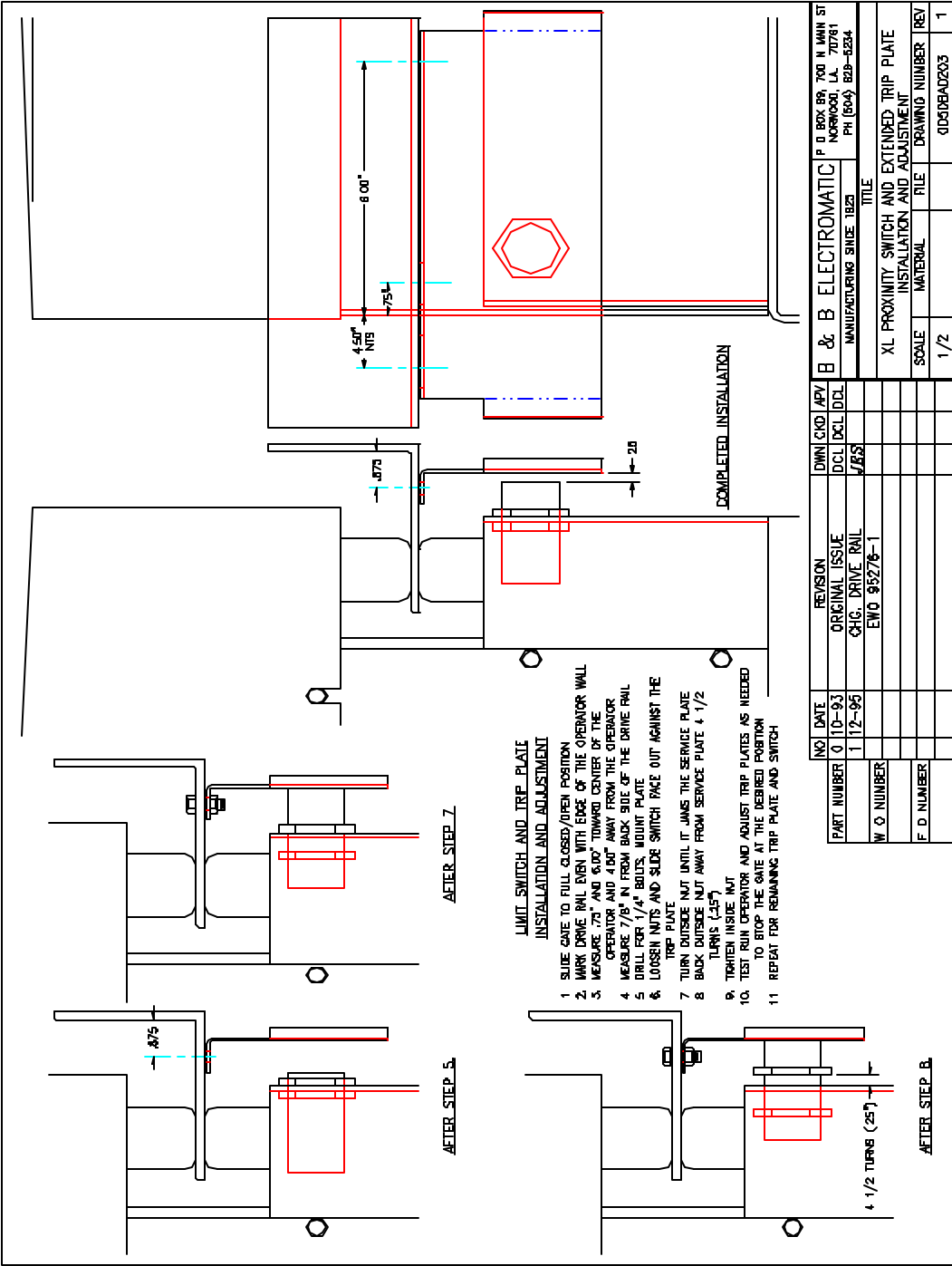


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NO.	DATE	REVISION	OWN	CHK	APP	DATE	NO.	DATE	REVISION	OWN	CHK	APP
PART NUMBER	010-83	ORIGINAL ISSUE	DCI	DCI	DCI	11-85	W O NUMBER					
	11-85	CHG. DRIVE RAIL				7/28						
		EWG 95276-1										
F O NUMBER												

B & B ELECTROMATIC		P O BOX 94, 705 N MAIN ST	
MANUFACTURING SINCE 1928		NORWOOD, LA. 70761	
TITLE		PH(504) 628-5234	
XL PROXIMITY SWITCH AND TRIP PLATE			
INSTALLATION AND ADJUSTMENT			
SCALE	MATERIAL	FILE	DRAWING NUMBER
1/2			DD508AD201
REV			1



1 ? Power Wiring					
HP	Voltage Amps	Wire Gage	mm ²	Single Operator	Dual Operators
1/2	115 V	12	3.309	80	40
	7.5 A AC	10	5.261	130	65
1/2	208 V	12	3.309	290	145
	3.9 A AC	10	5.261	460	230
1/2	230 V	12	3.309	340	170
	3.7 A AC	10	5.261	540	270
1	115 V	12	3.309	50	25
	12 A AC	10	5.261	80	40
1	208 V	12	3.309	180	90
	6.4 A AC	10	5.261	290	145
1	230 V	12	3.309	220	110
	6 A AC	10	5.261	350	175
1 1/2	115 V	12	3.309	40	20
	15 A AC	10	5.261	70	35
1 1/2	208 V	12	3.309	140	70
	8.3 A AC	10	5.261	230	115
1 1/2	230 V	12	3.309	170	85
	7.5 A AC	10	5.261	280	140
2	208 V	12	3.309	90	45
	13.2 A AC	10	5.261	140	70
2	230 V	12	3.309	110	55
	12 A AC	10	5.261	180	90
3	208 V	12	3.309	60	30
	18.7 A AC	10	5.261	100	50
3	230 V	12	3.309	80	40
	17 A AC	10	5.261	120	60

3 ? Power Wiring					
HP	Voltage Amps	Wire Gage	mm ²	Single Operator	Dual Operators
1/2	208 V	12	3.309	510	255
	2 A AC	10	5.261	820	410
1/2	230 V	12	3.309	580	290
	2 A AC	10	5.261	920	460
1/2	460 V	12	3.309	1165	582
	1 A AC	10	5.261	1850	925
1	208 V	12	3.309	320	160
	3.5 A AC	10	5.261	510	255
1	230 V	12	3.309	390	195
	3.2 A AC	10	5.261	620	310
1	460 V	12	3.309	1560	780
	1.6 A AC	10	5.261	2480	1240
1 1/2	208 V	12	3.309	190	95
	6.2 A AC	10	5.261	300	150
1 1/2	230 V	12	3.309	230	115
	5.6 A AC	10	5.261	370	185
1 1/2	460 V	12	3.309	940	470
	2.8 A AC	10	5.261	1490	745
2	208 V	12	3.309	90	45
	6.2 A AC	10	5.261	140	70
2	230 V	12	3.309	110	55
	5.6 A AC	10	5.261	180	90
2	460 V	12	3.309	150	75
	2.8 A AC	10	5.261	230	115

3 ? Power Wiring (Continued)					
HP	Voltage Amps	Wire Gage	mm ²	Single Operator	Dual Operators
3	208 V	12	3.309	150	75
	7.8 A AC	10	5.261	240	120
3	230 V	12	3.309	180	90
	7.4 A AC	10	5.261	280	140
3	460 V	12	3.309	720	360
	3.7 A AC	10	5.261	1150	575
5	208 V	12	3.309	90	45
	15 A AC	10	5.261	140	70
5	230 V	12	3.309	110	55
	13.2 A AC	10	5.261	180	90
5	460 V	12	3.309	150	75
	6.6 A AC	10	5.261	230	115

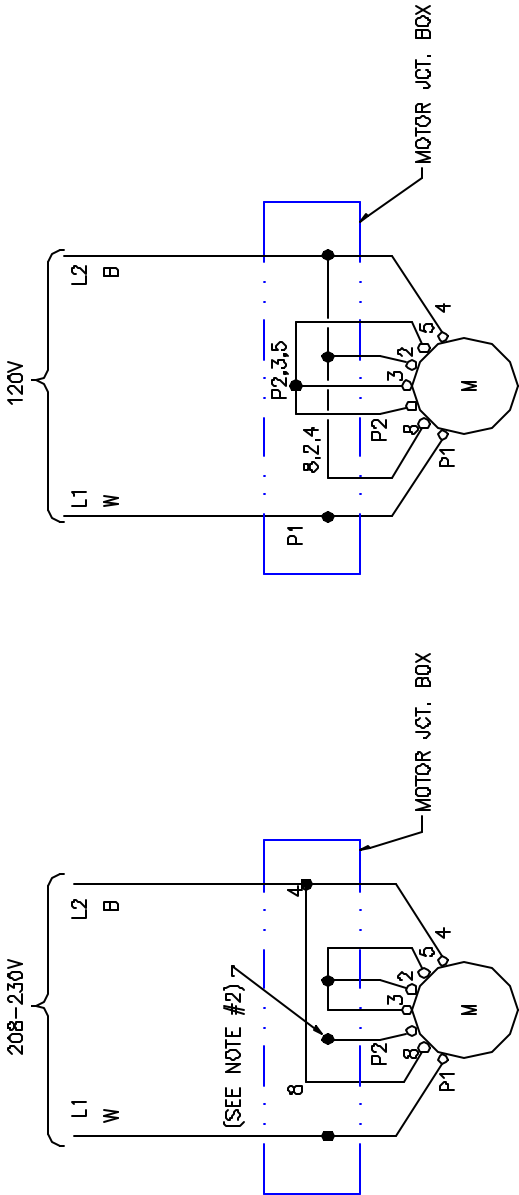
Control Wiring			
Voltage	Wire Gage	mm ²	Distance (ft)
24 V	28	0.081	450
24 V	26	0.129	710
24 V	24	0.205	1140
24 V	20	0.518	2890
24 V	18	0.823	4600

Notes	
1	Maximum distance is measured from Power Source to Operator
2	Maximum distance for controls is measured from Operator to Pushbutton or Other device
3	If distance to power Source is greater than value shown use a higher voltage or three phase unit or contact utility company for a service feeder
4	If distance to Remote Control device is greater than 2000ft use a range extender device.
5	Power Labels are based on stranded copper wires and allows up to 2% voltage drop
6	Control Table is based on stranded copper wires and allows up to 25% Connect Power per local codes
7	Connect Power per local codes
8	Run Power and Control wiring separately
9	Ampere rating is motor full load. Startup up current may be higher
10	100 VA Allowed for Controls & Heater
11	Wires sizes and resistance is from Megajani.
12	0.1 Amps for control current these may well vary for different models

Battery Backup Input (1 ?)					
HP	Voltage Amps	Wire Gage	mm ²	Single Operator	Dual Operators
0.4	115 V	12	3.309	120	60
	4.6 A AC	10	5.261	200	100
0.4	208 V	12	3.309	430	215
	2.5 A AC	10	5.261	680	340
0.4	230 V	12	3.309	510	255
	2.3 A AC	10	5.261	820	410
0.75	115 V	12	3.309	90	45
	6.9 A AC	10	5.261	140	70
0.75	208 V	12	3.309	290	145
	3.8 A AC	10	5.261	470	235
0.75	230 V	12	3.309	370	185
	3.4 A AC	10	5.261	580	290
1.3	115 V	12	3.309	50	25
	13 A AC	10	5.261	80	40
1.3	208 V	12	3.309	160	80
	7.2 A AC	10	5.261	260	130
1.3	230 V	12	3.309	190	95
	6.7 A AC	10	5.261	310	155

AWG Stranded Wire Resistance			
Size	mm ²	Diameter mm	R @ 77°F Ohms /1000'
28	0.081	14.6	66.14
26	0.129	0.468	41.76
24	0.205	0.59	26.18
22	0.326	0.744	16.46
20	0.518	0.938	10.36
18	0.823	1.162	6.52
16	1.309	1.491	4.08
14	2.081	1.88	2.58
12	3.309	2.371	1.62
10	5.261	2.969	1.02
8	8.366	3.77	0.64
6	13.3	4.753	0.402

TERMINAL MARKINGS AND CONNECTIONS
FOR 1Ø GATES

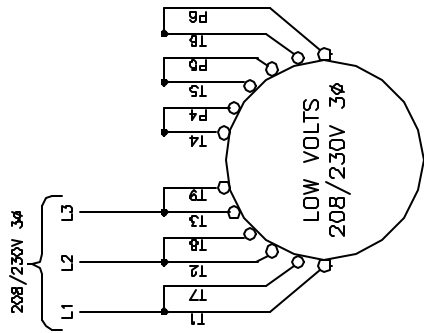


MOTOR LEAD CONNECTIONS
115V, 1Ø

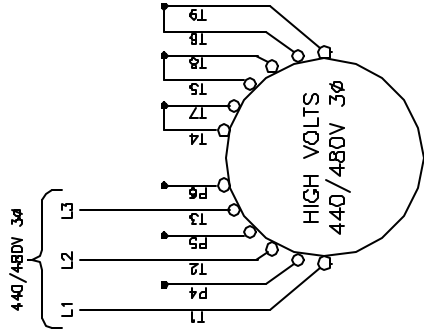
- NOTES: 1. VERIFY MOTOR LEAD CONNECTIONS BY COMPARING TO DIAGRAM ON POWER UNIT MOTOR.
2. PLACE A WIRE NUT ON THE P2 WIRE IN THE JUNCTION BOX OF THE MOTOR WHEN HIGH VOLTAGE (208-230V) POWER IS USED.
3. TRANSFORMER WIRING MUST ALSO BE CHANGED. SEE TRANSFORMER WIRING FOLLOWING.
4. SOME MOTORS ARE COLOR CODED; OTHERS ARE NUMBER CODED.

B&B ELECTROMATIC		P.O. BOX 99, 700 N MAIN ST
MANUFACTURING SINCE 1925		NORWOOD, LA 70761
TITLE		PHONE (504) 629-5234
VOLTAGE CONVERSION, 1Ø		
SCALE	MATERIAL	FILE
		DWG NUMBER
		REV
		0050AEO009
		B/92

TERMINAL MARKINGS AND CONNECTIONS FOR 3Ø MOTORS



LEAD CONNECTIONS
208–220V, 3Ø



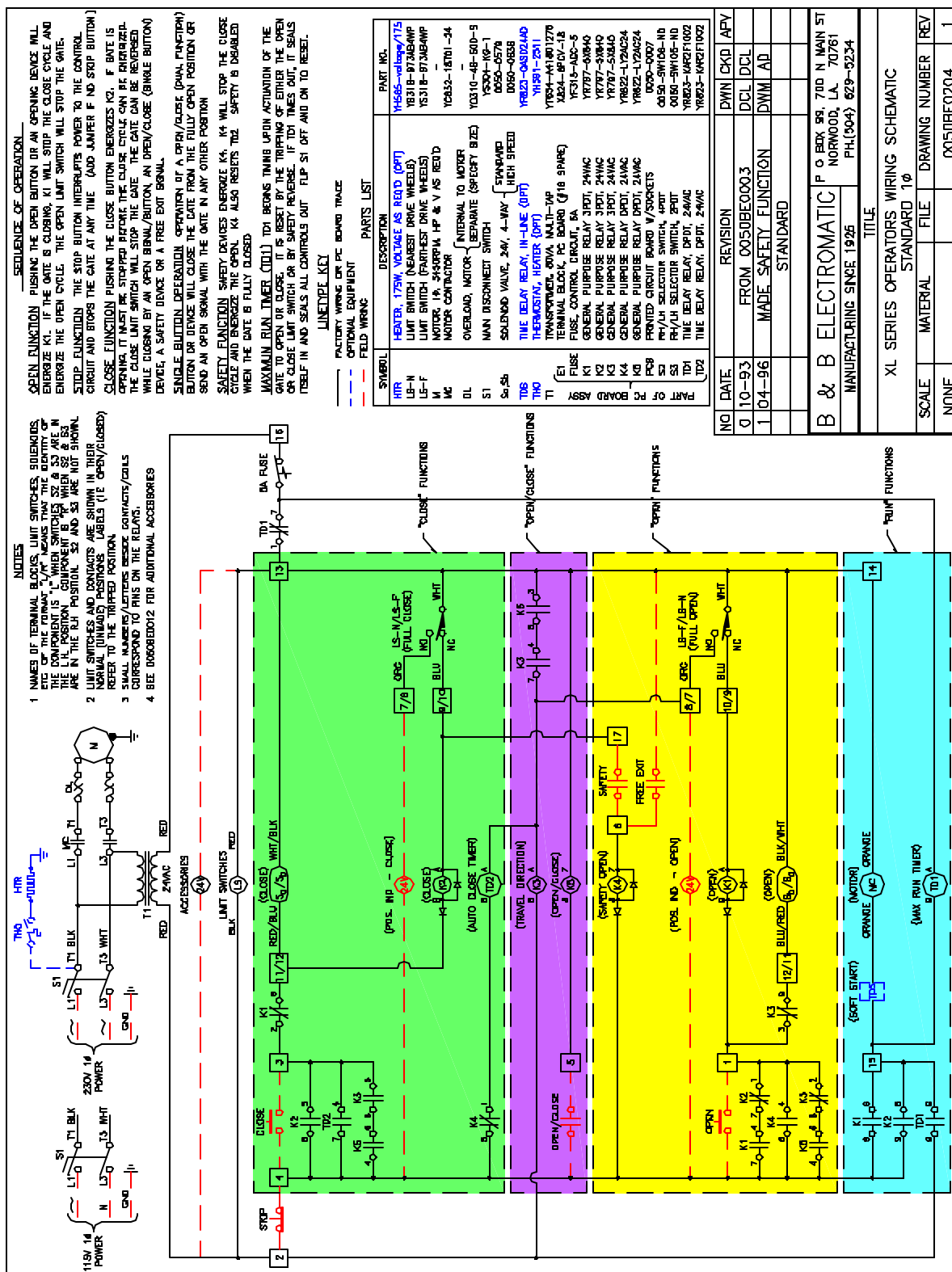
LEAD CONNECTIONS
440–480V, 3Ø

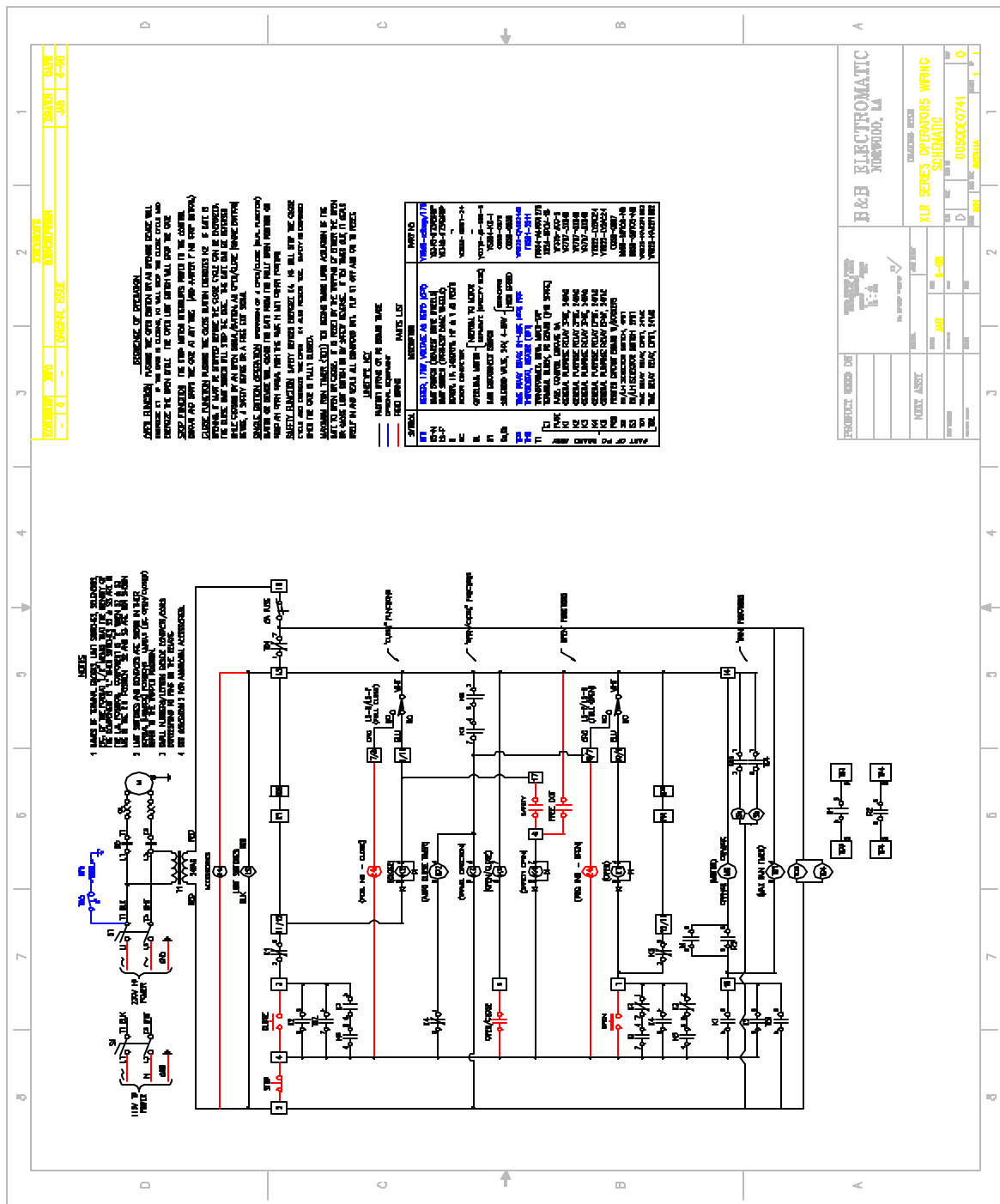
NOTES:

1. VERIFY MOTOR LEAD CONNECTIONS BY COMPARING TO DIAGRAM ON POWER UNIT MOTOR
2. TRANSFORMER WIRING MUST ALSO BE CHANGED.
3. SEE TRANSFORMER WIRING FOLLOWING
3. MOTOR MUST BE WIRED TO TURN COUNTERCLOCKWISE VIEWED FROM THE SHAFT END.
4. MOTORS HAVE AN INTERNAL OVERLOAD

B&B ELECTROMATIC		P.O. BOX 89, 700 N MAIN ST NORWOOD, LA 70761 PHONE (504) 628-5234	
MANUFACTURING SINCE 1925			
TITLE			
VOLTAGE CONVERSION, 3Ø			
SCALE	MATERIAL	FILE	DWG NUMBER
			REV
			0050AE0010
			5/92







B&B ELECTROMATIC
HOMERIDGE, LA

XLR SERIES OPERATIONS WIRING
SCHEMATIC

0025020741

1



TYPICAL ACCESSORIES & OPTIONS WIRING

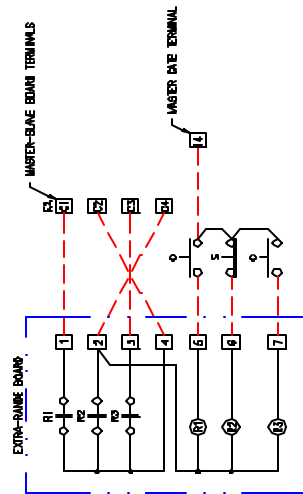
1. 3-BUTTON PUSHBUTTON	6. PUSHBUTTON WITH ON/OFF SWITCH	11. MULTIPLE PUSHBUTTONS	14. RANGE EXTENDER W/PUSHBUTTON
2. OPEN ONLY	7. FREE EXIT	12. POSITION INDICATION LIGHTS	15. HEATER AND THERMOSTAT
3. SINGLE BUTTON CONTROL	8. HOLD OPEN		
4. SAFETY DEVICES	9. SOFT START		
5. MAXIMUM RUN TIMER	10. AUTOMATIC CLOSE TIMER	13. (RESERVED FOR FUTURE USE)	
<p>A PLUG-IN MAXIMUM RUN TIMER (TD1) IS STANDARD. STANDARD RANGE IS 0-100 SECONDS. A MULTI-RANGE TIMER WITH LONGER MAXIMUM RUN TIME IS PROVIDED WITH "D" AND "T" SERIES. OPEN S1 TO RESET.</p>	<p>A PLUG-IN TIMER TO AUTOMATICALLY CLOSE THE OPERATOR IS PROVIDED. THE AUTOMATIC CLOSE TIMER IS LABELED TD2 ON THE PREWIRED RELAY BOARD.</p>	<p>A HYDRAULIC BYPASS VALVE CAN BE PROVIDED AS AN ALTERNATE MANUAL RELEASE FOR THE DRIVE WHEELS.</p>	<p>USE ONLY 24VAC LAMPS. 24VAC RELAYS CAN BE WIRED WITH COILS SUBSTITUTED FOR LAMPS TO CONTROL ACCESSORY COMPONENTS.</p>
<p>B&B ELECTROMATIC MANUFACTURING SINCE 1925 TITLE ACCESSORIES AND OPTIONS WIRING FILE DRAWING NUMBER 0050BED012 REV (13) 4-96</p>			

PARTS LIST - AC OPERATORS

E2: TERMINAL BLOCK, X824-6PCV-8
E3: TERMINAL BLOCK, X824-6PCV-9
E4: TERMINAL BLOCK, X824-6PCV-7
K8: G.P. RELAY 3PDT, 24VAC, YR797-5X840
K7: G.P. RELAY 3PDT, 24VAC, YR797-5X840
K6: G.P. RELAY DPDT, 24VAC, YR822-LVAC24
K5: G.P. RELAY DPDT, 24VAC, YR822-LVAC24
K4: G.P. RELAY 3PDT, 24VAC, YR797-5X840
K10: PRINTED CIRCUIT BOARD, D050-0585
PCB2: TIME DELAY RELAY, DPDT, 24VAC/DC, YRB23-KAR2F1002
TD2:

PARTS LIST - DC OPERATORS

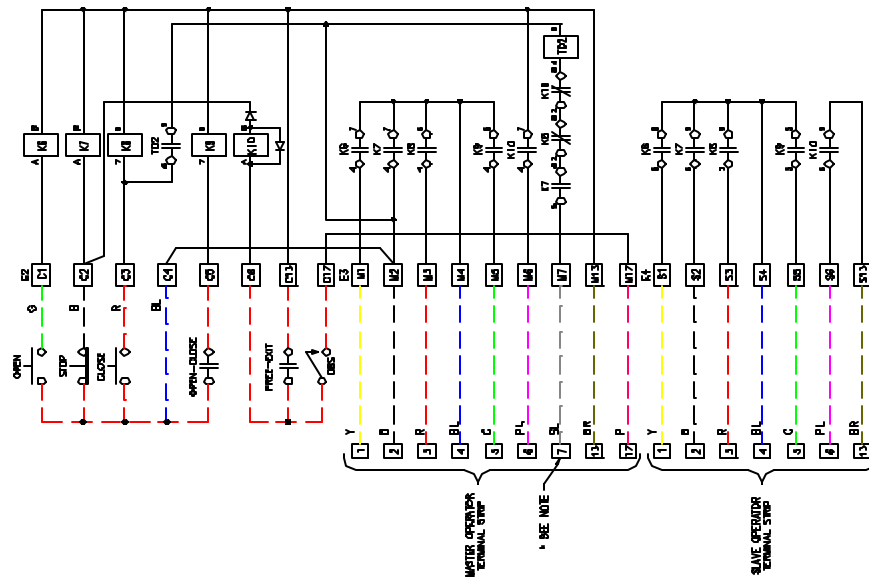
E2: TERMINAL BLOCK, XB24-6PCV-8
 E3: TERMINAL BLOCK, XB24-6PCV-8
 E4: TERMINAL BLOCK, XB24-6PCV-8
 K6: G.P. RELAY 3PDT, 24VDC, YR787-1A488
 K7: G.P. RELAY 3PDT, 24VDC, YR787-1A488
 K8: G.P. RELAY DPDT, 24VDC, YR822-LYDC24
 K9: G.P. RELAY DPDT, 24VDC, YR822-LYDC24
 K10: G.P. RELAY 3PDT, 24VDC, YR787-1A488
 PCB2: PRINTED CIRCUIT BOARD, D060-0585
 TD2: TIME DELAY RELAY, DPDT, 24VAC/DC, YR823-KAR2F1002



NOTE: CROSS WIRE TERM.#2 & 4 TO TERM. #C2 & C4 AS SHOWN.

EXTRA-RANGE BOARD CONNECTION

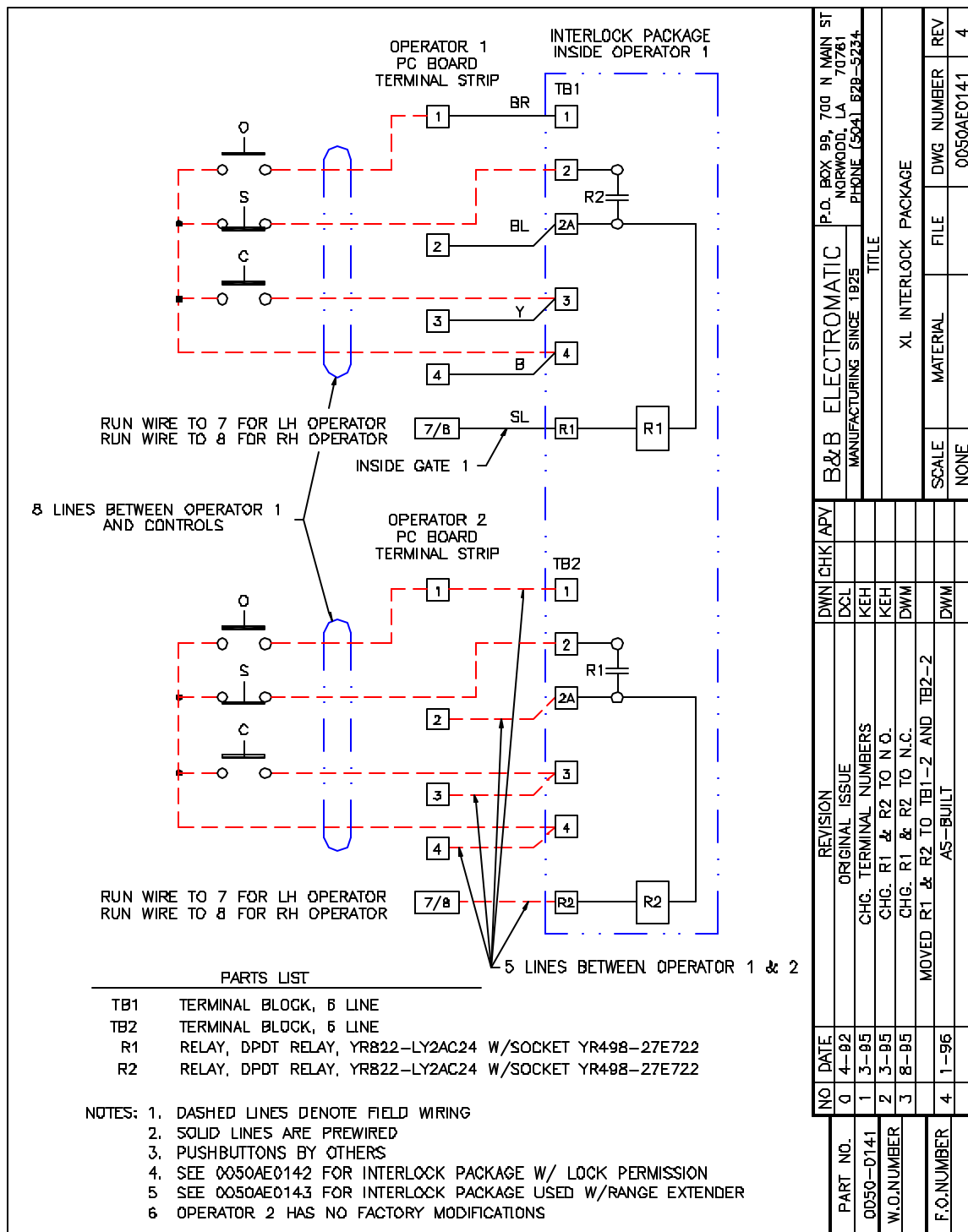
NO	DATE	REVISION	DWN	CHK	APV
3	4-91	UPDATED PARTS LIST	RVM		
4	5-91	ADD NOTE	RVM		
5	4-92	ADD JUMPER BETWEEN S2-M2	KCH		
6	5-92	CHG. TITLE	RER		
7	9-92	ADD SLAVE TERMINAL #13	ROC		
8	1-93	ADD DC PARTS LIST	DCL	DCL	
9	3-93	REMOVE JUMPER W2 - S2	ROC	DCL	ROC



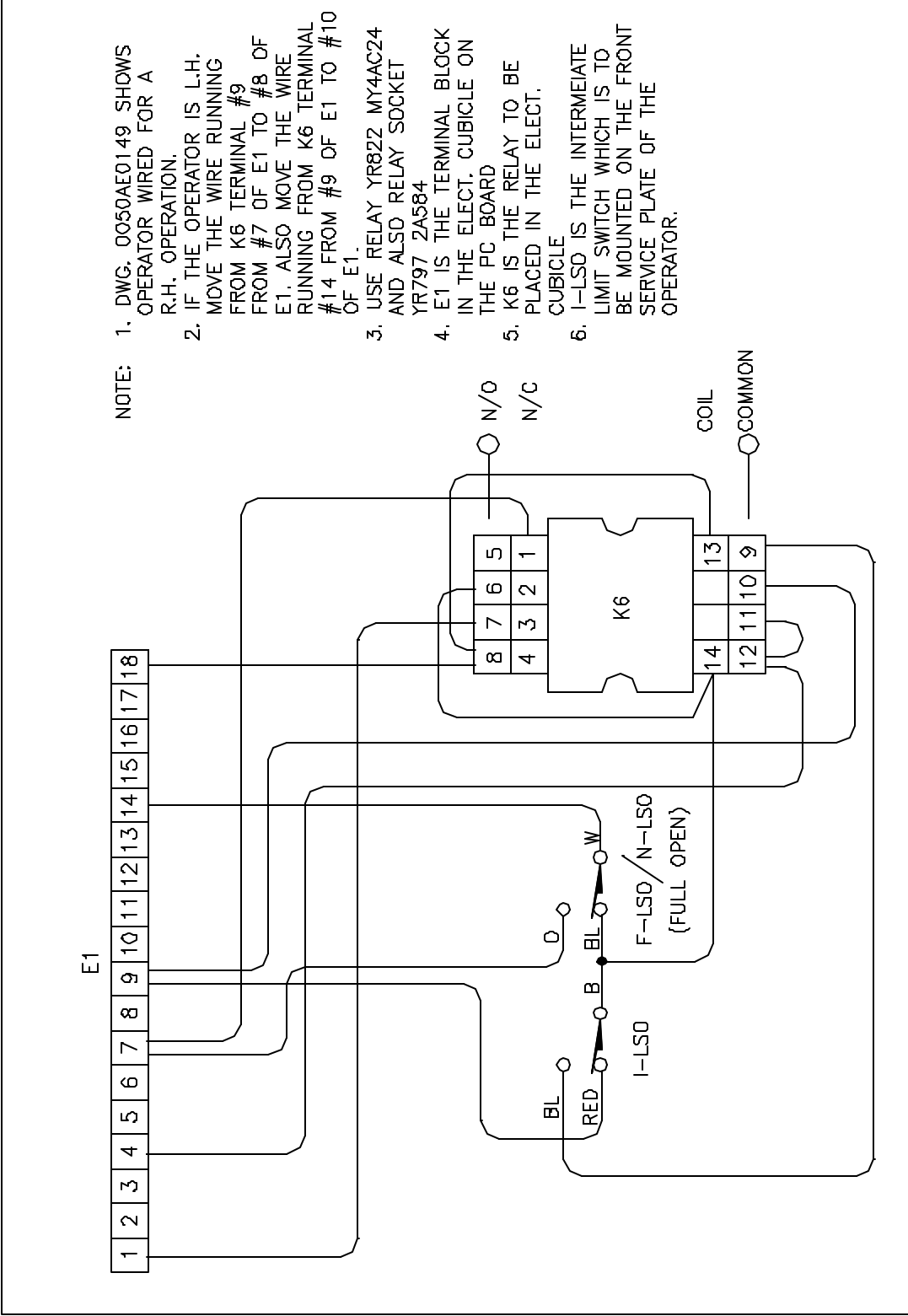
COLOR CODE

B	-	BLACK
BL	-	BLUE
BR	-	BROWN
G	-	GREEN
O	-	ORANGE
P	-	PINK
PL	-	PURPLE
R	-	RED
SL	-	SLATE (GRAY)
W	-	WHITE
Y	-	YELLOW

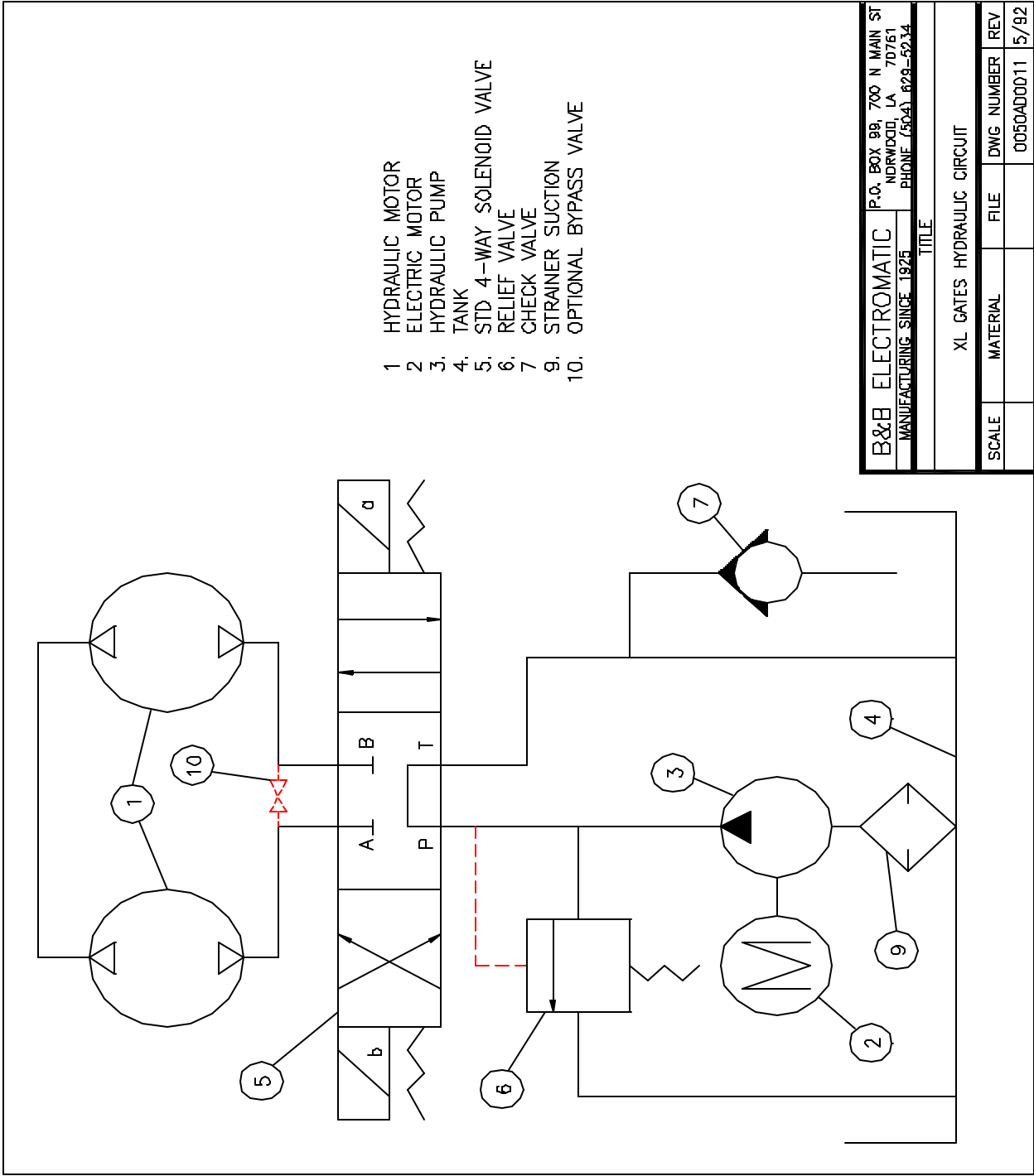
* NOTE: IF MASTER GATE IS LEFT HAND, RUN WIRE FROM M7 TO
TERMINAL 8 OF MASTER GATE TERMINAL STRIP



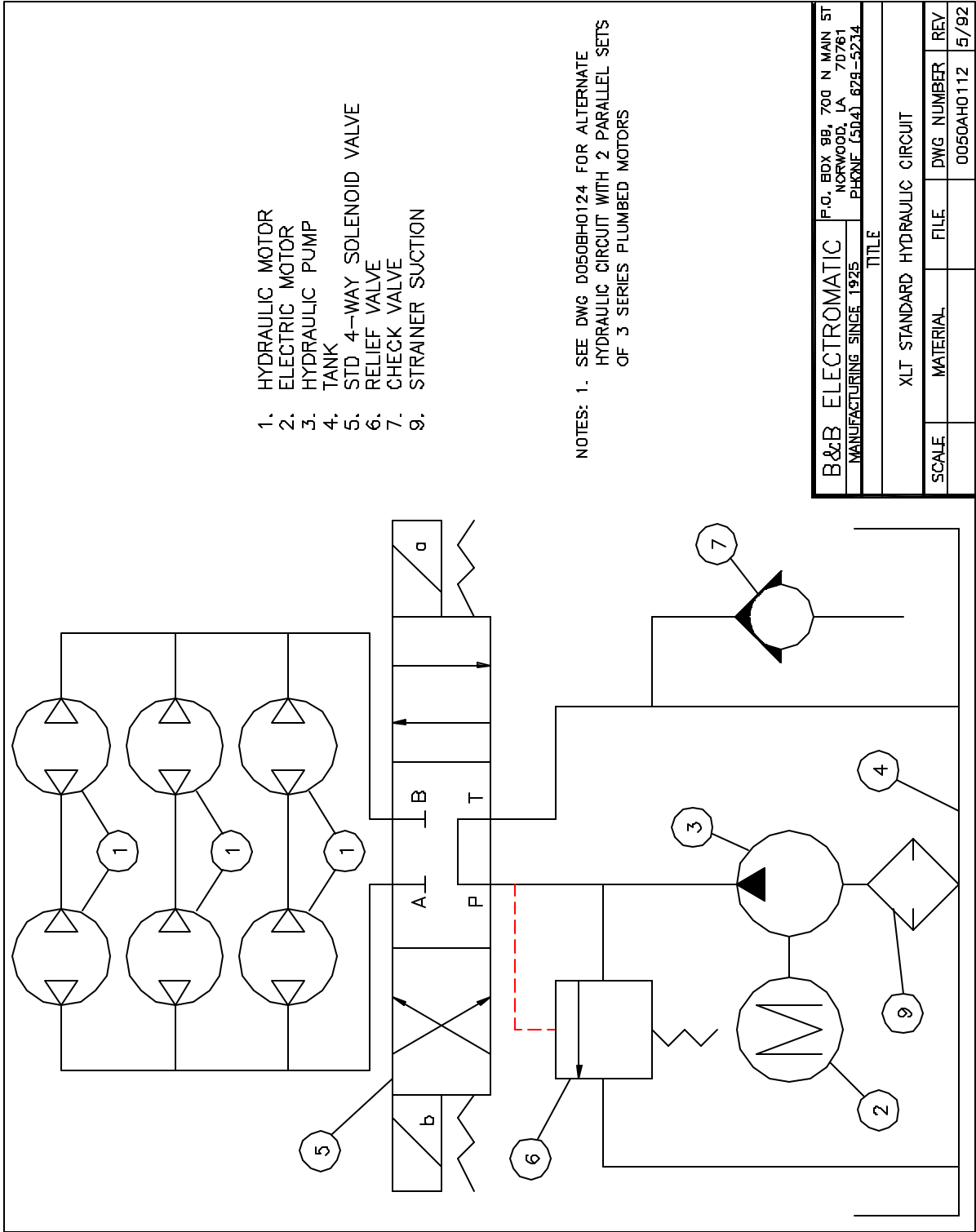
B&B ELECTROMATIC		P.O. BOX 98, 700 N MAIN ST NORWOOD, LA 70761		PHONE (504) 828-5234	
MANUFACTURING SINCE 1925		TITLE		XL INTERLOCK PACKAGE	
NO	DATE	REVISION	DWN	CHK	APV
0	4-92	ORIGINAL ISSUE	DCL		
1	3-95	CHG. TERMINAL NUMBERS	KEH		
2	3-95	CHG. R1 & R2 TO N.O.	KEH		
3	8-95	CHG. R1 & R2 TO N.C.	DWM		
4	1-96	MOVED R1 & R2 TO TB1-2 AND TB2-2	DWM		
PART NO.		F.O. NUMBER		AS-BUILT	
0050-014-1					
W.O. NUMBER		SCALE		NONE	
		MATERIAL		FILE	
		DWG NUMBER		REV	
		0050AE014-1		4	



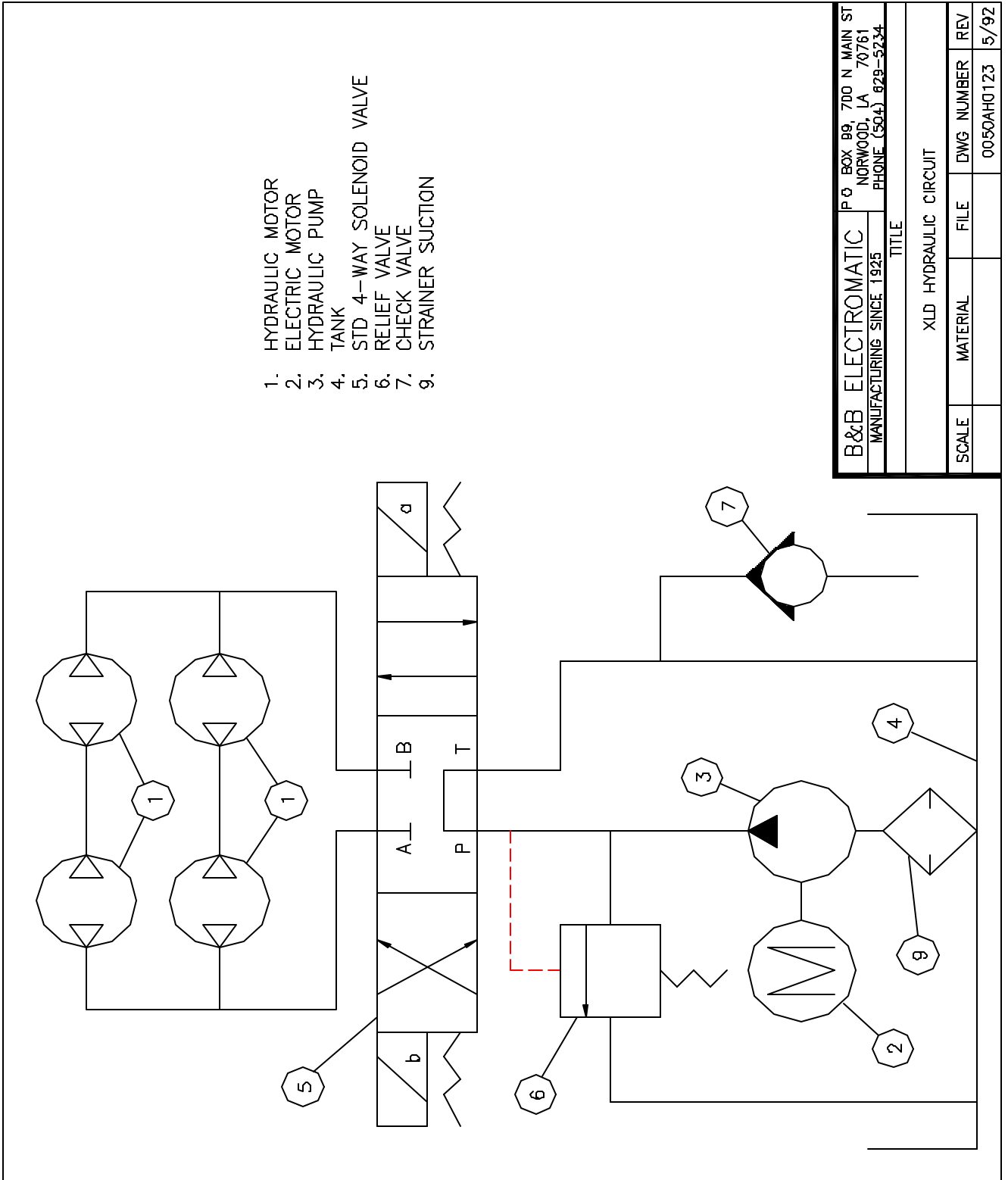
PART NO	NO	DATE	REVISION				DWN	CHK	APV	B&B ELECTROMATIC			P.O. BOX 99, 700 N MAIN ST NORWOOD, LA 70761 PHONE (504) 629-5234		
			0	5-92	ORIGINAL ISSUE		KEH			MANUFACTURING SINCE 1925					
W.O. NUMBER	1	6-93			CORRECTED NOTES		KEH			TITLE					
	2	5-95			CHG. WIRE COLORS		KEH			INTERMEDIATE LIMIT SWITCH ADAPTION WIRING					
	3	9-95			PER AAC MARK-UPS "BUCK"		KEH								
F.O. NUMBER										SCALE	MATERIAL	FILE	DWG NUMBER	REV	
										NTS			0050AE0149	3	

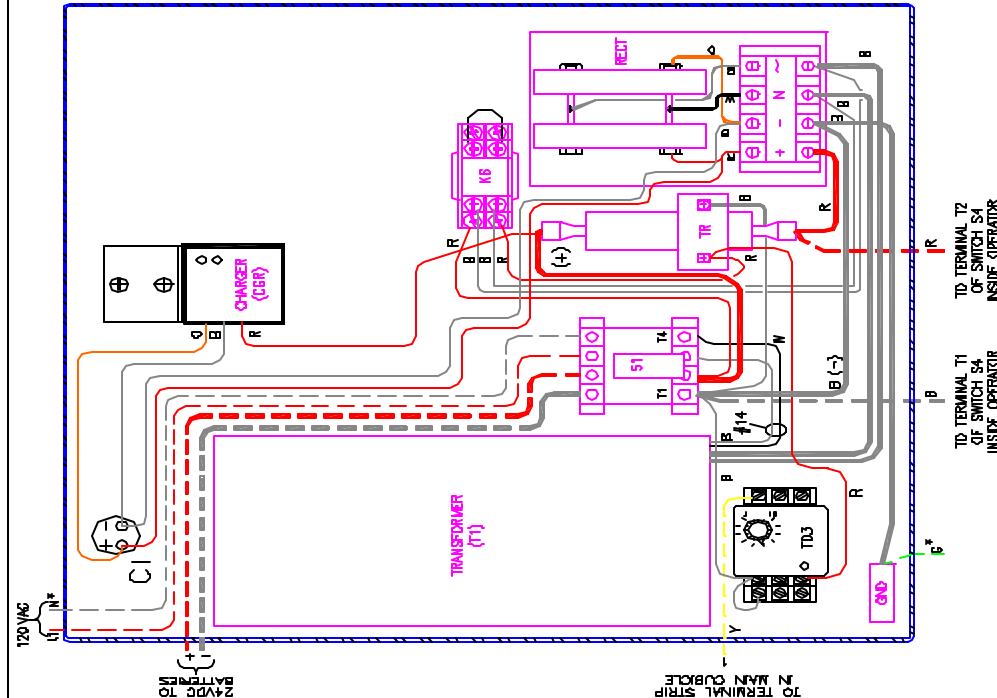


B&B ELECTROMATIC		P.O. BOX 98, 700 N MAIN ST NORWOOD, LA 70761	
MANUFACTURING SINCE 1925		PHONE (504) 828-5234	
TITLE			
XL GATES HYDRAULIC CIRCUIT			
SCALE	MATERIAL	FILE	DWG NUMBER
			0050AD0011
			REV
			5/92

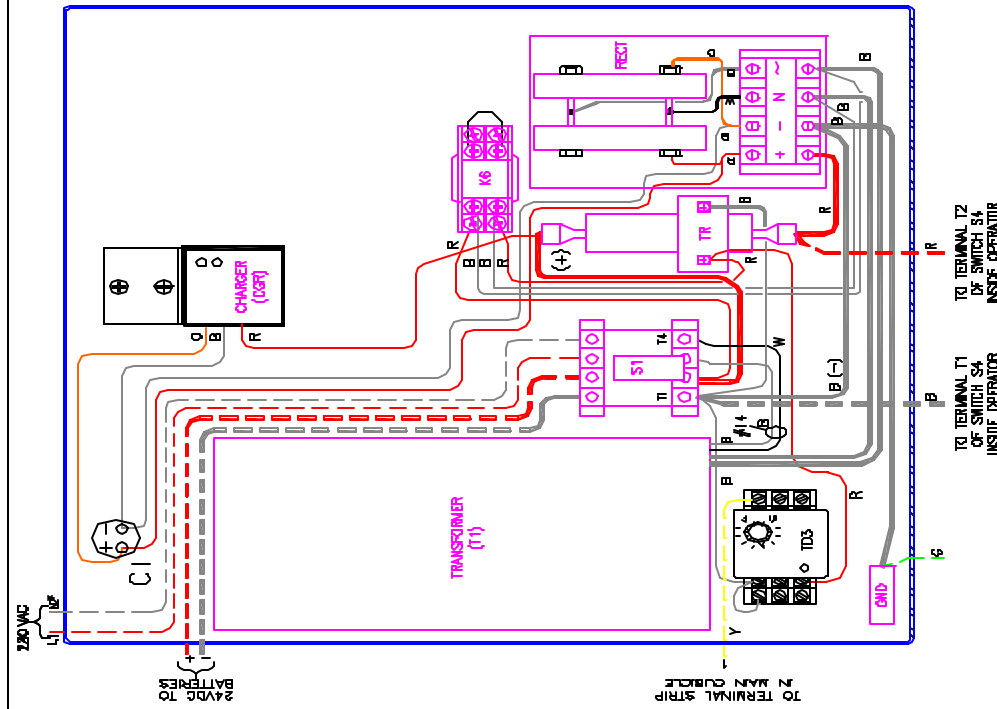


B&B ELECTROMATIC		P.O. BOX 98, 700 N MAIN ST NORWOOD, LA 70761 PHONE (504) 828-5214	
MANUFACTURING SINCE 1925			
TITLE			
XLT STANDARD HYDRAULIC CIRCUIT			
SCALE	MATERIAL	FILE	DWG NUMBER
			0050AH0112
			REV
			5/92





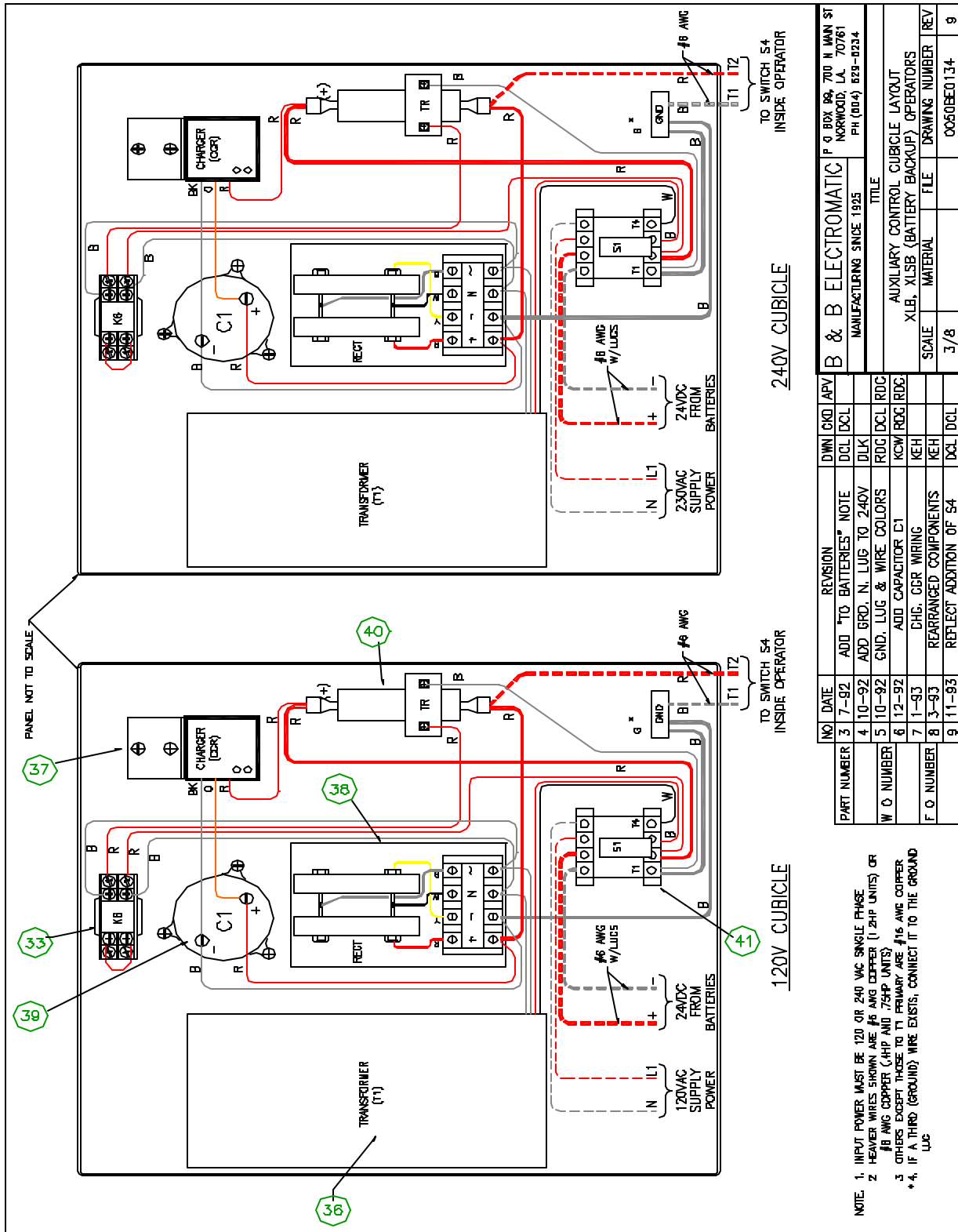
120V CUBICLE



240V CUBICLE

NOTE: 1. INPUT POWER MUST BE 120 OR 240 VAC SINGLE PHASE
 2. HEAVIER WIRES SHOWN ARE #6 AWG COPPER (12HP UNITS) OR #8 AWG COPPER (4HP AND 75HP UNITS)
 3. OTHERS EXCEPT THOSE TO T1 PRIMARY ARE #16 AWG COPPER
 *4. IF A THIRD (GROUND) WIRE EXISTS, CONNECT IT TO THE GROUND LUG

NO	DATE	REVISION	DWN	CKD	APV	P	O	B	X	88	700	N	MAN	ST
PART NUMBER	0	5-92	COMPONENT CHANGES	DCL		B	&	B	E	E	L	E	C	T
1	7-92	LABEL "TO BATTERIES"	DCL	DCL										
2	10-92	ADD N LUG TO 240V	DLK											
3	12-92	ADD CAPACITOR C1	KCW	RDC	RDC									
4	1-93	CHANGED CHARGER	DCL	DCL										
5	11-93	REFLECT S4	DCL	DCL										
F.O. NUMBER														
SCALE														
MATERIAL														
DRAWING NUMBER														
REV														
3/B														
DC060ED145														
5														

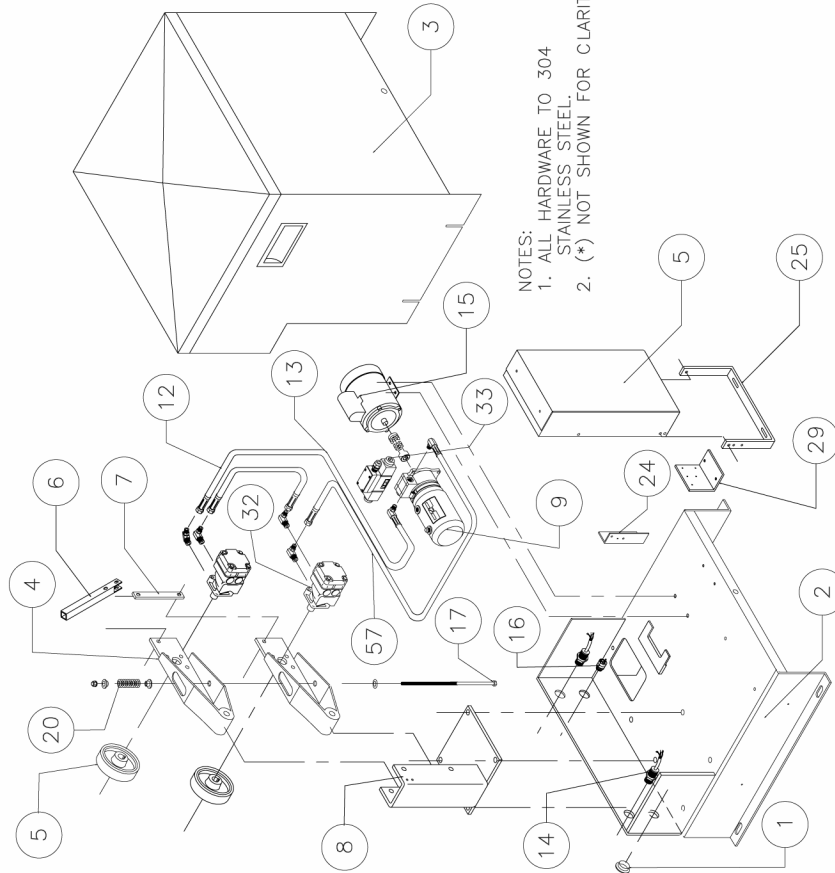


NO	DATE	REVISION	DESCRIPTION	APV
1	7-92	ADD "TO BATTERIES" NOTE	DCL	DCL
2	10-92	ADD "TO GND. N. LUG TO 240V"	DCL	DCL
3	10-92	GND. LUG & WIRE COLORS	RDC	DCL
4	12-92	ADD CAPACITOR C1	KCW	RDC
5	1-93	CHG. CDR WIRING	KEH	
6	3-93	REARRANGED COMPONENTS	KEH	
7	11-93	REFLECT ADDITION OF S4	DCL	DCL

PART NUMBER	REVISION	DESCRIPTION	APV
1	7-92	ADD "TO BATTERIES" NOTE	DCL
2	10-92	ADD "TO GND. N. LUG TO 240V"	DCL
3	10-92	GND. LUG & WIRE COLORS	RDC
4	12-92	ADD CAPACITOR C1	KCW
5	1-93	CHG. CDR WIRING	KEH
6	3-93	REARRANGED COMPONENTS	KEH
7	11-93	REFLECT ADDITION OF S4	DCL

NO	DATE	REVISION	DESCRIPTION	APV
1	7-92	ADD "TO BATTERIES" NOTE	DCL	DCL
2	10-92	ADD "TO GND. N. LUG TO 240V"	DCL	DCL
3	10-92	GND. LUG & WIRE COLORS	RDC	DCL
4	12-92	ADD CAPACITOR C1	KCW	RDC
5	1-93	CHG. CDR WIRING	KEH	
6	3-93	REARRANGED COMPONENTS	KEH	
7	11-93	REFLECT ADDITION OF S4	DCL	DCL

ITEM NO	QTY	PART OR IDENTIFYING NO	DESCRIPTION	PARTS LIST	DRAWING NUMBER - MATERIAL	ALLOC
57	1	XHYD-HOSE-LXL-1	FEEDER HOSE		0054-0517-A	-
56	1	-	-		-	-
55	-	-	-		EA, LXL	1
54	-	-	-		EA, SINGLE	1
53	1	YF315-AGC-5	FUSE		EA, 5 AMP, SLO-BLOW	1
52	1	XTRAN-241-B-20	TRANSFORMER		EA, 115V/20V	1
51	1	XSW-KG1	SWITCH		EA, MAIN DISCONNECT	1
50	-	-	-		-	-
49	1	0050-0001-1	PRE-WIRED RELAY BOARD		-	1
48	1	XCONT-25024V	CONTACTOR		EA, 24V 3 POLE	1
47	1	XCONT-25024V	CONTACTOR		EA, FEEDER TPEL, BRASS	1
46	1	XCONV-25024V	CONVERTER		EA, STRAIGHT	2
45	1	XCONV-HE2119	UNIV. BUSHING		EA, .875"	1
44	2	110-0410-GRADE8	BOLT		EA, .250-20 X 1 GRADE 8	2
43	4	XBRG-EP081216	BEARING		EA, OILITE SLEEVE	4
42	1	0054-H24238	WASHER		EA, ZINC PLATED	1
41	-	-	-		-	-
40	1	0054-0512	COVER		0054-0512-A	1
39	2	0054-0513	THIMBLE, ARM MOUNT		0054-0513-A	2
38	1	0054-0515	SPACER, SPRING		0054-0515-A	1
37	1	XPIPE-PP-12	PLUG		EA, PLASTIC, .750"	1
36	4	0050-3790	MOUNTING KIT		EA, HYD SOLENOID VALVE	4
35	2	0050-0632	TRIP PLATE PROX. SWT		EA, LIMIT SWITCH	2
34	1	0068-2615	NAMEPLATE		EA, ALUMINUM	1
33	1	XHYD-VALVE-DC	VALVE, MOTOR		EA, SORT STOP SHFT, 24 VDC	1
32	1	XHYD-VALVE-OR	VALVE, MOTOR		EA, SORT STOP SHFT, 24 VDC	1
31	1	0050-0511	WIRE CLAMP ASSEMBLY		EA, .0511 X .806	2
30	1	0050-124569	WASHER		EA, 1.015 PLATED STEEL	1
29	1	0054-0516	DISCONNECT BRACKET		0054-0516-A	1
28	1	0050-LC-112M-7	SPRING		EA, 1.095 X 4 LONG	1
27	1	0054-0510	MOUNTING PLATE		0054-0510-A	-
26	2	XPUSH-98404A005	SELF-LOCKING PUSH PIN		EA, .188" X .500 LONG	2
25	1	0054-0508	MOUNTING BRACKET		0054-0508-A	-
24	1	0054-0509	REST ANGLE		0054-0509-A	-
23	2	0050-8X1.SUR	WHEEL, BLACK		EA, 1.00 BORE	2
22	1	0000-	TAG, MAN. RELEASE LEVER		EA, IDENTIFICATION, LXL	1
21	1	0050-BBLOGO	LOGO, B&B		EA, ALL BLACK LETTER	1
20	1	XSPR-LHL1250C-9	SPRING		EA, 1.25 X 5.00 LONG	1
19	1	0054-0514	PLUNGER HEAD		0054-0514-A	1
18	1	110-08120C-G	BOLT		EA, .500 X 4.500"	1
17	1	XARM-SC628AN	ARM		EA, .500 X 1.00"	1
16	1	1001-150-1/2	MOTOR		EA, MALORY, SC628AN	1
15	2	Y3318-973ABAWP	SWITCH		EA, TEFC, 3450 RPM	1
14	1	XHYD-HOSE-LXL-2	JUMPER HOSE		EA, 30MM PROX	2
13	1	XHYD-HOSE-LXL-2	TOP FEEDER HOSE		0054-0518-A	-
12	1	XHYD-HOSE-LXL-3	PUMP		0054-0519-A	-
11	1	XHYD-M406-0105	PUMP		EA, 2000 PSI, 6X6 RES.	1
10	.8	XHYD-UNVIS-J26	HYD. OIL		EA, GALLON, J26	.8
9	1	XHYD-M406-0105	PUMP		EA, 2000 PSI, 6X6 RES	1
8	1	0054-0504	MOTOR MAST ASSEMBLY		0054-0504-A	-
7	1	0050-0571	LEVER CONNECTING LINK		0050BD0571	-
6	1	0054-0506	LEVER, MANUAL RELEASE		0054-0506-A	-
5	1	0054-0505	ELECTRICAL BOX W/ LID		0054-0505-A	-
4	2	0054-0503	MOUNT, HYD. MOTOR, LXL		0054-0503-A	-
3	1	0054-0502	COVER, LXL		0054-0502-A	-
2	1	0054-0501	FINISHING PLUG		0054-0501-A	-
1	1	XPLUG-85985K26	FINISHING PLUG		EA, NYLON, FITS 1.188" I.D.	1



NOTES:
 1. ALL HARDWARE TO 304 STAINLESS STEEL.
 2. (*) NOT SHOWN FOR CLARITY

REPLACEMENT PARTS

Mechanical Components

PART NUMBER	DESCRIPTION
0050-6X1.5UR	Drive Wheel, 6.00 O.D. Durometer Urethane, 1" wheel bore
0050-0029	Idler Wheel, 6.00 O.D. Durometer Urethane, 1" wheel bore for N XLR
0050-S836	Drive Wheel, Rack & Pinion, (Spur Gear) 1" wheel bore for XLR
0050-01143	Cap, Breather
0050-0508-16	Drive Rail, extruded aluminum (16' section)
0050-0508-24	Drive Rail, extruded aluminum (24' section)
0050-0650A	Splice kit, drive rail, aluminum or steel rail
0050-0508-S10	Drive Rail, galvanized steel (10' section)
0050-0508-S20	Drive Rail, galvanized steel (20' section)
0050-0508-R	Drive Rail, rack and angle (priced per foot)
0050-0508-12	Drive Rail, extruded aluminum (12' section)
0050-0508-25	Drive Rail, extruded aluminum (15' section)
0050-0541	Splice plate, for drive rail rack
0050-0632	Trip plate, limit switch, high speed (for proximity switches)
0050-0220	Bulkhead Bracket (optional emergency remote release)
0-100-35320-180	Cable, Pull (optional emergency remote release)
0050-0723	Linkage (optional emergency remote release)

REPLACEMENT PARTS

Hydraulic System Components

PART NUMBER	DESCRIPTION
XHYD-MTR08-OR	Hydraulic motor
XHYD-VALVE-DC	Solenoid control valve, 4-way
0050-0965	Solenoid, control valve, 4-way, 24 V D/C standard (1.2 fps NXLB battery backup operators)
0050-0113	O- Ring for solenoid valves
0050-1005	Mounting bolts, solenoid valve (4 per unit)
0040-M406-0103	Pump & reservoir assy, high speed operators
0040-M406-0105	Pump & reservoir assy, standard speed operators
0050-01134	Screen, suction filter (internal to reservoir)
XHYD-HOSE-LXL-2	Jumper hose assembly
XHYD-HOSE-LXL-3	Feeder hose assembly

REPLACEMENT PARTS

Electrical Components

PART NUMBER	DESCRIPTION
	Motor, electric, 115/230V, 1-phase, 1.5 hp, with manual overload
	Motor, electric, 208/460V, 3-phase, 1.5 hp, with manual overload
	Motor, electric, 115/230V, 1-phase, 2 hp, with manual overload
	Motor, electric, 208/460V, 3-phase, 2 hp (requires external overload)
	Motor, electric, 115/230V, 1-phase, 3 hp (requires external overload)
	Motor, electric, 208/460V, 3-phase, 3 hp (requires external overload)
	Motor, electric, 115/230V, 1-phase, 1/2 hp with manual overload
	Motor, electric, 208/460 V, 3-phase, 1/3 hp (requires external overload)
	Motor, electric, 24V D/C, 1.3 hp
YS318-973AB4WP	Limit Switch, proximity, 24V A/C or D/C
YS822-D4C1620-C	Limit Switch, lever type (used as an intermediate switch)
YO310-46-500 AMPS (not shown)	Overload, 1-phase, specify hp of unit (or complete model and serial number); available in 4 / 6 / 10 / 12 / 15 Amps
YO832-12T13H-AMPS (not shown)	Overload, 3-phase, specify hp of unit (or complete model and serial number); available in 1.4 - 2.2 / 1.8 - 2.8 / 2.9 - 4.3 / 4 - 6 / 6 - 9 Amps
YC832-18TO1-24	Contracor, motor, 24 VA/C, standard models
YT654-A41801276	Transformer (1-phase units), control circuit, 80 VA, 104/110/208/220 volt primary, 24 volt secondary (not for Battery Backup or Fail Safe models)
YT654-A41801296	Transformer (3-phase units), control circuit, 80 VA, 208,220,416,440 volt primary, 24 volt secondary (not for Battery Backup or Fail Safe models)
0050-0007	Prewired relay board assembly, less relays and timer
0050-0007-1	Prewired relay board assembly, with relays and Max. Run Timer
YR797-5X840	Relay, general purpose, 3PDT, 24V A/C
YR797-1A488	Relay, general purpose, 3PDT, 24V D/C
YR822-LY2AC24	Relay, general purpose, miniature, DPDT, 24V A/C
YR797-LY2DC24	Relay, general purpose, miniature, DPDT, 24V D/C

YR823-KAR2F1002	Relay, time delay, 0-100 second, 24V A/C or D/C (also called TD-2)
YR823-KAR2H24AD	Relay, time delay, 15-640 second, 24V A/C or D/C (for extra large gates)
YF315-AGC-5	Fuse, 5 Amp, Slo-Blow
YT365-216-1161	Transformer (battery backup modela with 1.2 hp) 1.5 KVA
0050-0188	Battery Charger, 24V D/C, used for Battery Backup units
0022-0011	Bridge Rectifier, 70 Amps, full wave, Battery Backup units, std. speed
0022-0011-1	Bridge Rectifier, 100 Amps, full wave, Battery Backup units, high speed
XCAP-33000/40	Capacitor, 33000 mF, 40 volts D/C
	Contactactor, solenoid style, 24V D/C 60 Amps, for Battery Backup units
YS789-OETL-63C4	Switch, main disconnect, for "battery back-up units
YS304-KG-1	Switch, main disconnect, 1-phase (except battery back-up units)
YS304-KG-2	Switch, main disconnect, 3-phase (except battery back-up units)
YO310-40-Amp-DC	Breaker, 40 Amps, 24V D/C, used in standard speed Battery Backup units.
YO310-60-Amp-DC	Breaker, 60 Amps, 24V D/C, used in high speed Battery Backup units
J161412SSH	Battery Box, Fiberglass (for 2 batteries, used with Battery Backup units)

